SIEMENS

TV-PCCOMBI

FD 150
FD 200
FD 201
FD 202
FD 203

SERVICE-MANUAL

Ausgabe 9612
Issue

Änderungen vorbehalten
Subject to modifications

Mat.-Nr. 5356 5

Note: This Manual contains only the TV-section for the PC-TV-combi.
For detailed PC informations, please refer to the users guide books of PC-section.
They are includet the PC-package.

TABLE OF CONTENTS

Page

GENERAL TEST PROCEDURES 1
- SYSTEM BLOCK DIAGRAM 2
- BUTTON, LED, JR. PANEL TEST 4
- HEADPHONE BOARD 5
- EXT. AV1/AV2 MODULE 6
- AV OUTPUT CONNECTOR 7
- SCART CONNECTOR (EURO AV) 8
- TV-TUNER 9
- AUDIO ATTRIBUTE TEST 11
- VIDEO ATTRIBUTE CONTROL 11
- TV/PC SWITCH TEST AND DPMS TEST 12
- POWER 12
- AUDIO TEST PROCEDURE 15
- TELETEXT MODULE TEST PROCEDURE 17
ALIGNMENT PROCEDURE OF MONITOR SECTION 18
VOLTAGE & SIGNAL CHARTS 22
MONITOR SECTION WIRING DIAGRAM 29
TV-SIGNAL P.C.B. COMPONENT DIAGRAM 31
TV-SIGNAL SCHEMATIC DIAGRAM I 33
TV-SIGNAL SCHEMATIC DIAGRAM II 35
TELETEXT DECODER SCHEMATIC DIAGRAM 37
TELETEXT DECODER INTERFACE SCHEMATIC DIAGRAM 39
VT & AUDIO AMP. CONNECTOR SCHEMATIC DIAGRAM 41
SOUND IF SCHEMATIC DIAGRAM 43
NICAM SCHEMATIC DIAGRAM 45
TWO CARRIER SOUND SCHEMATIC DIAGRAM 47
AUDIO, HEADPHONE & BASS BOOSTER SCHEMATIC DIAGRAM 49
AUX CONNECTOR & FRONT PANEL INTERFACE SCHEMATIC DIAGRAM 51
SIGNAL SELECTION SCHEMATIC DIAGRAM 53
INT-EXT CONNECTORS & AUDIO MAX SCHEMATIC DIAGRAM 55
ISA INTERFACE & IR SCHEMATIC DIAGRAM 57
EDGE CONNECTOR SCHEMATIC DIAGRAM 59
ISA & PCI CONNECTOR DIAGRAM 61
ISA & PRIVATE SOUND CONNECTOR DIAGRAM 63
POWER SUPPLY SCHEMATIC DIAGRAM 65
DEFLECTION SCHEMATIC DIAGRAM 69
VIDEO SCHEMATIC DIAGRAM 73
DEFLECTION P.C.B. COMPONENT DIAGRAM 77
POWER SUPPLY P.C.B. COMPONENT DIAGRAM 79
VIDEO P.C.B., JACK P.C.B., CONTROL P.C.B. COMPONENT DIAGRAM 83

SIEMENS

TV-PCCOMBI

FD 202

SERVICE-MANUAL

Ausgabe 9612
Issue

Änderungen vorbehalten
Subject to modifications

Mat.-Nr. 53 5 15

Note: This Manual contains only the TV-section for the PC-TV-combi.
For detailed PC informations, please refer to the users guide books of PC-section.
They are includet the PC-package.

TABLE OF CONTENTS

Page

GENERAL TEST PROCEDURES 1
- SYSTEM BLOCK DIAGRAM 2
- BUTTON, LED, JR. PANEL TEST 4
- HEADPHONE BOARD 5
- EXT. AV1/AV2 MODULE 6
- AV OUTPUT CONNECTOR 7
- SCART CONNECTOR (EURO AV) 8
- TV-TUNER 9
- AUDIO ATTRIBUTE TEST 11
- VIDEO ATTRIBUTE CONTROL 11
- TV/PC SWITCH TEST AND DPMS TEST 12
- POWER 12
- AUDIO TEST PROCEDURE 15
- TELETEXT MODULE TEST PROCEDURE 17
ALIGNMENT PROCEDURE OF MONITOR SECTION 18
VOLTAGE & SIGNAL CHARTS 22
MONITOR SECTION WIRING DIAGRAM 29
TV-SIGNAL P.C.B. COMPONENT DIAGRAM 31
TV-SIGNAL SCHEMATIC DIAGRAM I 33
TV-SIGNAL SCHEMATIC DIAGRAM II 35
TELETEXT DECODER SCHEMATIC DIAGRAM 37
TELETEXT DECODER INTERFACE SCHEMATIC DIAGRAM 39
VT & AUDIO AMP. CONNECTOR SCHEMATIC DIAGRAM 41
SOUND IF SCHEMATIC DIAGRAM 43
NICAM SCHEMATIC DIAGRAM 45
TWO CARRIER SOUND SCHEMATIC DIAGRAM 47
AUDIO, HEADPHONE & BASS BOOSTER SCHEMATIC DIAGRAM 49
AUX CONNECTOR & FRONT PANEL INTERFACE SCHEMATIC DIAGRAM 51
SIGNAL SELECTION SCHEMATIC DIAGRAM 53
INT-EXT CONNECTORS & AUDIO MAX SCHEMATIC DIAGRAM 55
ISA INTERFACE & IR SCHEMATIC DIAGRAM 57
EDGE CONNECTOR SCHEMATIC DIAGRAM 59
ISA & PCI CONNECTOR DIAGRAM 61
ISA & PRIVATE SOUND CONNECTOR DIAGRAM 63
POWER SUPPLY SCHEMATIC DIAGRAM 65
DEFLECTION SCHEMATIC DIAGRAM 69
VIDEO SCHEMATIC DIAGRAM 73
DEFLECTION P.C.B. COMPONENT DIAGRAM 77
POWER SUPPLY P.C.B. COMPONENT DIAGRAM 79
VIDEO P.C.B., JACK P.C.B., CONTROL P.C.B. COMPONENT DIAGRAM 83

1. General Test Procedures

This test specification is used for testing Fd 150, F20x. They are categorized as.

- System block diagram.
- System attached I/O and operation.
- Functions to be test.

1.1 System block diagram
(see attachment)

1.2 There are lot of I/O connectors that user accessible and user can control the machine and know the system operation status via button operation/LED indication or OSD display.

1.2.1 I/O and connectors

I/O

- EXT. AV1 (front side)
- EXT. AV2 (rear side)
- SCART CON. provide EXTERNAL AV In/Out (rear)
- AV output (rear)

Audio
- LINE TV Audio output (to private sound card slot)
- AUX. MIX Audio input (from private sound card slot)

Video
- Internal MPEG Video In (from riser card video con.)
- Internal Frame Grabber output (to riser card video con.)

- Headphone (front)
- External Mic, Phonejack and Internal Mic. (front)
- Tuner, (IEC type antenna connection)
- VGA signal cable with standard VGA male Conn.
- PC speaker

I/O for control

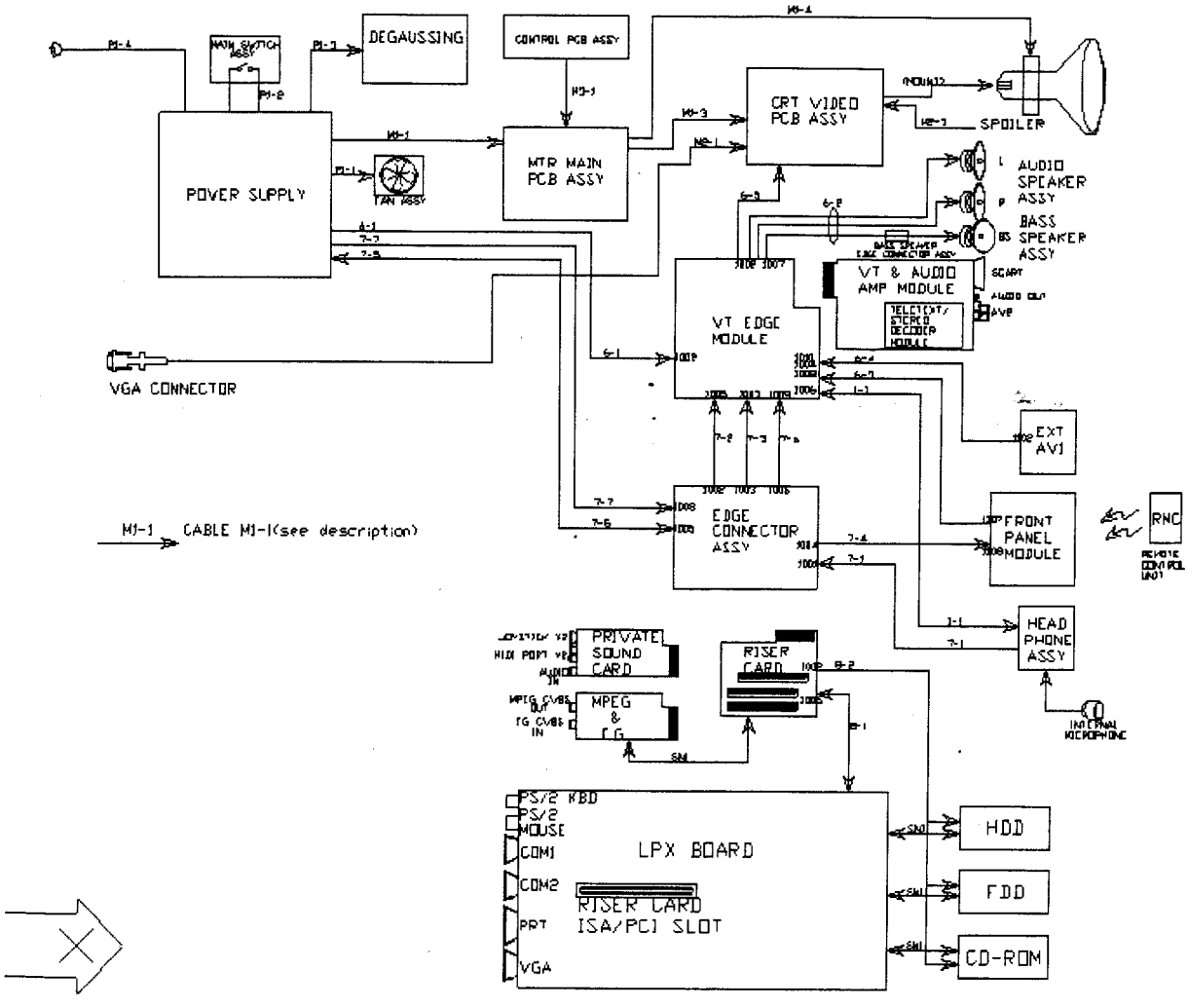
Power good
COM2 port & Aux. control signals (to riser card auxiliary con.)
Soft On/Off signal (to riser card auxiliary con.)
HDD indicator

Slot/Connector for standard PC application

3 ISA slot
2 PCI slot
1 private sound card slot provide ISA and concerned audio signal.
1 188p EISA type riser card golden finger.

[FD 150, 200, 201 und 202]

1.1 System Block Diagram



Power

110V/220V AC power inlet (rear)

Drivers power connector (on riser card)

1.2.2 Operation

The machine provide 2 kind of operating interfaces which are buttons on front panel and Remote Control unit to control the machine.

1.2.2.1 Front buttons and LEDs

main switch (for power control totally)
Soft on/off power switch
TV/PC switch
prog up/prog down
Vol. up/Vol. down
Soft on LED
Soft off LED (Orange)
TV (1H) LED
PC LED
HDD active LED
one IR. receiver to receive Remote Control unit income data.

for the monitor unit, there are 6 controls which cannot be controlled by Remote Control unit.

CONTRAST
BRIGHTNESS
VERTICAL SIZE
VERTICAL SHIFT
HORIZONTAL SIZE
HORIZONTAL SHIFT

the test will be listed in monitor unit

1.2.2.2 Remote Control Unit

The remote control unit can provide most of the function like front buttons except Main Switch and Soft off in PC application environment, but the unit provides a lot of the system setup operation interface for user. For the test procedure concerned items, will described in letter later.

[FD 150, 200, 201 und 202]

1.3 Function to be test

All of the I/O and operation buttons need to be tested, and the following specifed items need to be tested in order to make sure that user can operate w/o trouble according to specification

1.3.1 Main switch power on/off

1.3.2 Soft on/off

1.3.3 Audio/Video signal source input and output connection

1.3.4 Audio/Video signal source input switch/selection

1.3.5 TV/PC switch and DPMS

1.3.6 TV-tuner channel selection/control

1.3.7 Teletext decoder OSD and stereo decoder

1.3.8 Audio attribute control, L, R channel test

1.3.9 Video attribute control, contrast, brightness, sharpness, color

1.3.10 Internal Microphone test

1.3.11 Power supply

1.3.12 Monitor test

1.4 Environment test

1.4.1 The temperature specification must fulfill.

Operation IEC-721 (3K2)	15°C ~ 32°C
Operation IEC-721 (3K3)	5°C ~ 40°C (reduced MTBF)

1.4.2 The humidity requirement must fulfill

Operation IEC-721 (3K2)	10% ~ 75%
Operation IEC-721 (3K3)	15% ~ 100%

Condensation in operation must be avoided

1.4.3 The noise level in TV mode operation must fulfill

Sound power level $L_{WAD} \leq 4.8B$

Sound pressure level at operation position $L_{WAM} \leq 35dB$ (ISO 9296)

1.5 EMI/EMS test

The EMI/EMS test must satisfy with "CE symbol in accordance with EC guideline 891336/EEC (EN55022/B, EN50082-1, EN55013, EN55020, EN60555, Vfg147/86)."

1.6 Safety requirement

1.6.1 Safety

Safety must have the requirement of

IEC950 / EN60950 / VDE 0805

IEC65 / EN60065 / VDE 0860

1.6.2 Environmental compatibility

It must fulfill EPA requirement and Low emission as per MPRII and TCO'92 DHSS.

2. **Button; LED, IR. panel test** (front panel test)

They have been categorized in 1.2.2.1.

Test item include

- KEY MATRIX : only 1 key can be pressed at a moment. If 2 keys or more are pressed, only sky knows what happen.
- LEDs
- IR. receiver : the IR. receiver has the characteristics with 36kHz carrier, RC-5 code format.

before the test, please turn on the main power switch on front side of machine.

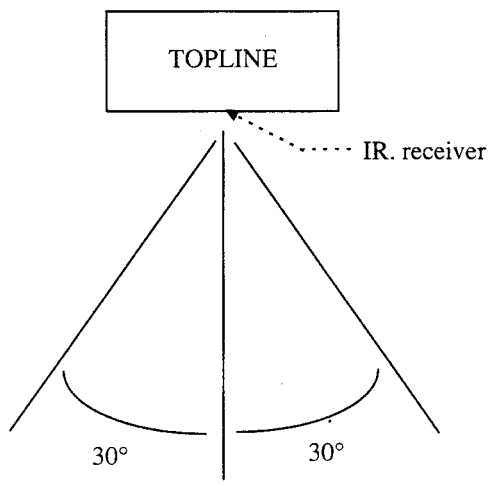
2.1 Test procedure

1. Connect the module to VT & Audio Amp. module and related module.
2. Press PWR. such that PWR on/off toggled and LED PWR, STBY will be lit in turn.
3. When PWR is on, press TV, PC such that TV, PC LED will be lit toggled. When TV LED is on, then 1H display mode is active, screen must be over scan.
4. Press the button PROG UP and PROG DN. then TV will switched to active channel and OSD will have display of channel No.
5. Press the button Vol. UP and Vol. DN., one can hear the volume loudly or silently depends on button operation and OSD have display to show the volume.
6. In PC mode, Execute a HDD access command, such that, HDD LED will be lit.
7. When PWR on and make an operation of picture from Remote Control Unit, the OSD menu must appear.

2.2 Test Criteria for IR. receiver/Remote Control Unit

Distance : 6 Meters

Angle : ± 30°



Each button must have function follow the operation spec. (refer to operation manual)

2.3 LEDs:

There are 5 LEDs are put in the front side of the machine. All LEDs are green light except one Orange color LED for SOFT off indications.
Each LED current must be between 8-12 mA while it's lit.
Remark : the LED, buttons arrangement is shown below.

3. Headphone board

- Microphone test : before the test, private sound card (or compatible board which can test Mic) must be installed in PC tray and Mic channel in sound card mixer must be active. The input level to private sound card must be less than 250mV_{P-P}.
- Headphone

3.1 Test procedure

3.1.1 Internal Mic.

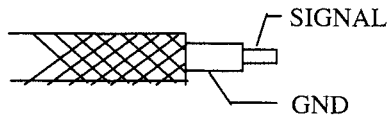
- Face to Mic. and give some sound/voice source. One can hear the speaker loud. The internal microphone test must fulfill attached Mic test spec.

[FD 150, 200, 201 und 202]

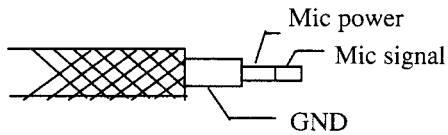
3.1.2 External Mic (Condenser/Inductor)

- Either condenser type or Inductor type of Mic. can be inserted in the system. The sound must be able to work.

Remark : The plug of inductor type Mic. must have the spec.

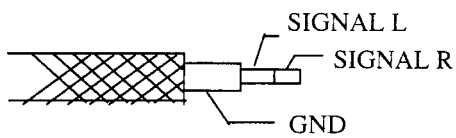


The plug of condenser type Mic must have the spec.



3.1.3 Headphone

- When a headphone is inserted, one can hear the sound from headphone, speaker must be muted while headphone is inserted.
- The side of L, R channel must be in correct arrangement.



Note : Before the headphone test, the audio must be activated, one can put the audio source from any one of the audio source that TOPLINE can accept.

3.2 Test criteria for Internal Mic.

- When the volume is adjusted to 3/4 full range, the echo phenomena due to Mic. must be not obvious.
- When the volume is adjusted to 1/4 the Mic. must be still have function which speaker can sound or use headphone to check.

3.3 Test Criteria for Headphone

Headphone output power : 30mW @ headphone impedance = $32\Omega_{DC}$

Headphone output voltage : $\leq 12V_{p\text{-}p}$

4. EXT. AV1/AV2 module

EXT. AV1 socket is put on the front side of the machine. EXT. AV2 socket is put at the rear side of the machine.

4.1 Test procedure

4.1.1 Insert EXT. AV source into the EXT. AV1 socket.

4.1.2 Use Remote controller or button on front panel to select the AV source from EXT. AV1 or AV2 module.

4.1.3 TV/PC button to TV

4.1.4 One can set the video on screen and hear the sound from EXT. AV1 source.

Remark :

1. the video RCA connector input must be $1V_{p-p}$ CVBS input.
2. Pattern (refer to PM5515 pattern generator)
   color bar
   VCR
   multiburst
   purity
   cross hatch

   Criteria for video :
   Each pattern must have the display requirement:
   no tilt on the screen
   correct color (color bar)
   screen must be over scan and no phase shift.
3. Audio input must be
   less than $1V_{RMS}$,Sine Wave
   100Hz (low frequency)
   1kHz (mid. frequency)
   12kHz (high frequency)
   3 frequencies must be tested.

   Criteria for audio :
   Under the input there must be no distortion when speaker output is less than peak value of 12V. The L/R channel correction must be checked. They should be correct.
4. Yellow color socket is for Video (CVBS)
   White color socket is for L-channel of audio.
   Red color socket is for R-channel of audio.

[FD 150, 200, 201 und 202]

5. AV output connector

For test the AV output, there must have one monitor unit which can accept CVBS input of PAL, SECAM L standard, and one 3.5mm diameter plug for audio check.

5.1 Test procedure

The test can be done in conjunction with other A/V input source test.
When there is selected active EXT. AV input, the AV output connector must be able to output corresponding signal come from AV input terminal both audio and Video.

5.2 Test criteria

Video output :
impedance : 75 Ω
amplitude : fulfill CVBS signal requirement
$1V_{p-p}$ output for 75Ω load.
and the CVBS standard must be the same as the standard of input source.

Audio output :

impedance : ≤ 1KΩ

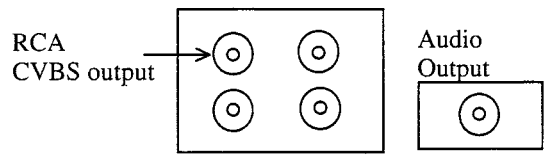
amplitude : $1V_{p-p}$ for the input $1V_{p-p}$ (max . ≤ $1V_{rms}$)

crosstalk : ≥ 40dB

The direction of L/R channel must be correct.

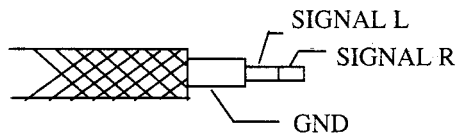
Remark :

- The video output RCA socket at rear side.



(Viewed from read side)

- 3.5 φ audio output, fulfill the arrangement of plug.



6. SCART connector (EURO AV)

There are both AV input and AV output for the test of AV input and AV output, the test procedure and criteria can refer to the test in EXT. AV1/AV2 and AV output.
And there is one special control for the AV input when the SCART connector is used for VCR, it is when VCR is playing, there is one signal "SCA_12V" (SCART con. pin 8) will become +12V immediately, which will make the system switch to select SCART connector AV as the A/V signal source when display is in TV mode (1H) display.
The other application is for the descrambler of PAY TV system. When certain TV channel is defined as PAY TV option, TV-Tuner's CVBS signal will be output to the AV output pins in SCART connector then the signal is processed via descrambler then feed back to AV input pins in SCART connector finally the descrammed TV Tuner program signals will be display on screen, so is Audio.

6.1 Test procedure

Select display in TV mode display (1H).

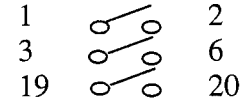
6.1.1 VCR interface test

1. Give the AV signal on SCART connector.
2. Let +12 V be low.
3. Use Remote Control unit button "0" to select EURO and TV of TV/PC such that the AV must be able to display the signal and sound the audio source from SCART connector.
4. Switch the AV input to any source exclude "EURO AV"
5. Switch the signal "SCA_12V" (SCART con pin 8) to +12V then the display/audio must be the signal from SCART AV input.

6.1.2 PAY TV signal path test

Before test, use Remote Control to config certain channel as PAY TV station and make one loop back connector like the follows.

SCART male type connector



and let the switches be closed.

1. Use Remote Control unit to select one PAY_TV channel which is active, then the display must be able to display. (In Philips's factory, the test must be replaced in loopback Conn.)
2. Turn the switch on SCART male type connector off (open). The Audio, Video can not be output.

Note : The test pattern for PAY_TV must have
color bar
VCR
multiburst
purity

6.2 Audio output path test

When there is audio output (speaker sound), the signal must be able to appear at SCART connector simultaneously. It is.

output impedance : ≤ 1KΩ

output amplitude : ≤ $1V_{rms}$

Crosstalk : ≤ 40dB

The direction of L/R channel must be correct.

[FD 150, 200, 201 und 202]

7. TV-TUNER

The TV-TUNER is able to support PAL B.G.H., I and SECAM L system, and there is one separate module which provides 2 carrier stereo TV audio system, NICAM audio decoder (option). The TV-Tuner provides one 8 page teletext decoder chip which support OSD display feature, too.

In the chapter, we'll focus on TV_Tuner test procedure. As to NICAM, Stereo decoder and teletext decoder will be described later.

Before the test, the pattern generator which is able to generate PAL B/G, H, I, SECAML (and L') RF signal is necessary. It's recommended that the equipment can generate stereo sound carrier of NICAM and/or 2 carrier stereo for later chapter in the machine.

7.1 TV tuner standard test

7.1.1 PAL B/G R.F. video test

1. Connect R.F. Antenna (IEC type) to pattern generator R.F. output
2. Let the pattern generator generate PAL BG standard R.F. signal, and let the pattern be color bar with the output level of 10mV.
3. Use Remote Controller unit to config the TV_Tuner system as BG system.
4. Set the channel No. that meet the frequency setting on pattern generator.
5. The video must appear on the screen with a good quality, otherwise adjust the local osc coil to proper position, such that video appear and AFC output is in the range of 3.0V ~ 4.0V (preferable value is 3.5Vdc)

7.1.2 PAL I R.F. video test

The procedure are the same as for PAL BG. R.F. video test except that item 2, 3must be modified

item 2. Let the pattern generator generate PAL I standard R.F. signal i.s.o PAL BG standard R.F. signal.

item 3. Use Remote Control unit to config the TV_Tuner system as I system.

for others, they are same as 7.1.1.

7.1.3 SECAM L R.F. video test

The procedure are the same as for PAL BG R.F. video test except that item 2, 3 must be modified.

item 2. Let the pattern generator generate SECAM L standard R.F. signal i.s.o PAL BG standard R.F. signal.

item 3. Use Remote control unit to config the TV_Tuner system as SECAM L system for others, they are same as 7.1.1.

Remark :

1. The pattern must be tested also as EXT. AV1/AV2.
2. In H/W design point of view. TDA8362-pin1 must be pull high when it is configured as SECAM L system, but the pin must has a capacitor connected to ground for audio purpose. (not used in Topline).
3. Once the channel is selected, the IDENT of TDA8362 will be > 6VDC when the channel is tuned, and the voltage of the AFC pin will be around 3.0 ~ 4.0V which means the pin has been fine tuned.

7.2 Stereo Decoder test

The decoder block is put in teletext/stereo decoder module.

Please use pattern generator which can generate analog stereo sound and NICAM stereo sound.

7.2.1 Stereo Decoder test

Before the test, make sure that the frequency has been selected with ATS mode. (one can check with television table which program No. corresponds to the frequency).

1. Use Remote Controller unit to select the program No.
2. Then the frequency for Left channel can be heard sound from Left channel. (3kHz is recommended). The frequency for Right channel can be heard sound from Right channel (1khz is recommended).

Remark : The sound waveform can be viewed with Oscilloscope. It must be a single frequency of sine wave sound only.

3. Please check screen, too. Press the buttons on pattern generator. If stereo sound is selected, VPS system will display stereo in somewhere of the screen , and if the mono sound or dual sound is selected, the screen must display mono or dual in somewhere of the screen respectively.

4. Please check the status that TDA8415 status register did. C the status have been read by F/W; too. Use audio attribute control Menu. to check the status can been seen on that menu.

Note : The sound check should be done for the TV standard described in 7.1.

7.3 NICAM Stereo Decoder (optional)

Use set-up menu (T.B.D) to configure the TV-standard to NICAM stereo sound then follow the procedure as 7.2.1 for the NICAM stereo sound.

8. Audio attribute test

There are several attributes which are for audio of the product. They are

BASS.
TREBLE
BALANCE
STEREO/SPATIAL STEREO

Before the attribute test, make sure there is one active audio sound output to speaker. It's recommended that use AV1 or AV2 as input with the specified spec described as before.

8.1 BASS

1. Use Remote Control unit to select audio feature (refer to user manual for operation) and make the BASS attribute heavy or light such that the response from speaker must be changed matched with operation.
2. Criteria
   (1). Range : -6dB ~ +6dB (1/2 ~ 2 times)
   (2). The output cannot be distortion under $1V_{p-p}$ input.
   (3). When there is heavy bass sound, it cannot affect video display.

8.2 TREBLE

The procedure is the same as BASS.

8.3 BALANCE

1. Use Remote Control unit to select audio and adjust BALANCE attribute. When the cursor is moved to left side. LEFT side speaker sound and RIGHT side speaker become silent.

8.4 STEREO / SPATIAL STEREO

8.4.1 Signal path correction

Take off one R or L audio input which is being selected the correspond channel of speaker must be silent and the other one is still sound, then do same procedure for other one.

8.4.2 Stereo/Spatial Stereo

Use Remote Control unit to control the switch of Stereo/Spatial stereo. One can hear the change of sound.

9. Video attribute control

There are four kinds of video attributes can be controlled in TV display mode. They are

BRIGHTNESS
CONTRAST
SHARPNESS
COLOR

remark : the attributes are only for R.G.B. signal of 1H display. The adjustment cannot affect CVBS output signal.

9.1 BRIGHTNESS :

When the cursor is moved to right side, the brightness must be brightness and viceversa. The adjustment can not affect the noise phenomena of picture.

9.2 CONTRAST :

When the cursor is moved to right side, the contrast ratio must be larger and vice versa. The adjustment can not affect the noise phenomena of picture.

[FD 150, 200, 201 und 202]

9.3 SHARPNESS :

When the cursor is moved to certain point in the status bar, picture become sharpest than in other position.

9.4 COLOR :

When the cursor is moved to certain point in the status bar, picture have correct color display.

Remark :

1. Before test, pattern generator must output color bar.
2. Either any one of the attribute is at the left or right, the picture must be able to be seen.

10. TV/ PC switch test and DPMS test

The test is used to test the video signal source of 1H video and PC VGA signal.

10.1 TV/ PC switch

Before the test, apply one CVBS signal at AV1 video input and one VGA signal (white pattern) at VGA cable connector of monitor, then do this :
Press TV/ PC button on front panel, the display will be alternate between TV display and PC display mode.

Remark : It's recommended that use color bar pattern to test.

10.2 DPMS (Deep Power Management)

In PC display mode, while no H SYNC or V SYNC appear at VGA cable connector for a period (≥ 100ms), the power for monitor must be disappear except power for filament.
The test must be done as follows.

1. Switch to PC display mode and the PC VGA has signal.
2. Remote the VGA signal source to VGA cable connector of monitor.
3. Wait for a moment (≥ 3 sec), the display must be disappear. (No border and power consumption reduce a lot (≥ 60W)).

11. Power/Signals flow between PC tray and Monitor unit

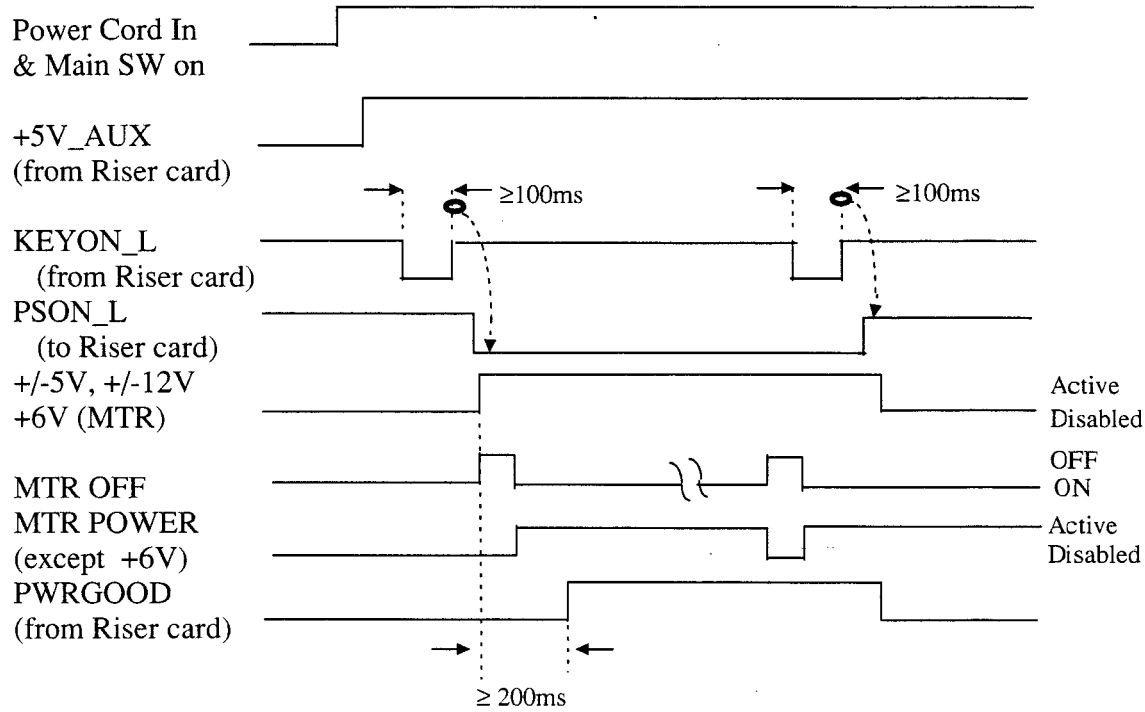
- Control and powers
- Communication
- Audio signals
- Video signals
- Add-on Card

11.1 Power and concerned control

The power must be measured are as follows.

- +/- 5V
- +/- 12V
- PWR GOOD
- +5V_AUX
- KEYON_L
- PSON_L

Insert power cord and main switch is on, then +5V_AUX must active forever and the other must follow the sequences



11.2 Soft On/Off

(please refer to 2.1, too)

There is one orange LED on front panel for the indication.

Test procedure:

1. If the current state of machine is soft off (orange LED lit) after mains cord has been installed and main SW. has been turned on, press the button such that the following will happen.

   (1). Power on LED (green) lit and soft off LED (orange) is turned off.
   (2). Machine start to boot.
   (3). Machine will stay at the state where it was before turning off (soft off or main switch off).

2. Press the button again, the machine will be turned off again.

Remark : The soft on/off state will be recovered to the state before main switch turn on/off.

11.3 Communications

There are 4 lines for communicating between PC tray and VT & Audio AMP module, (4 line are TTL level)

TXD : from PC tray to VT & Audio module
RXD : from VT & Audio Amp module to PC tray
RTS_L : from PC tray to VT & Audio Amp module
CTS_L : from VT & Audio Amp module to PC tray.

[FD 150, 200, 201 und 202]

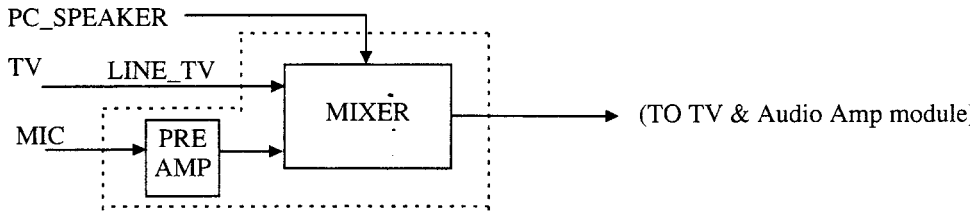
State from the 4 lines

	Idle	Data flow from PC tray	Data flow from Audio & Amp module
TxD	+5V	changed (carry data)	+5V
RxD	+5V	+5V	changed (carry data)
RTS_L	+5V	Low	high then low
CTS_L	+5V	high then low	Low

(for the command communicating between LPX and VT & Audio Amp module, please refer to S/W interface)

11.4 Audio signals

PC tray to Audio & Amp module (AUD_MIX) is the output from PC tray to VT & Audio Amp module, and two audio signal inputs to private sound card (TV, Mic, PC_Speaker as the input source).



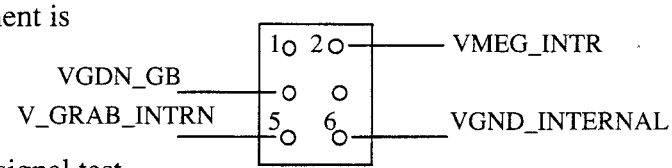
- Before test; set the audio source from any one of EXT. AV1 or AV2 etc. such that the signal will appear at LINETV of private sound card slot.
- Press TV/PC to PC mode.
- Run the private sound card application S/W and make the LINETV in Mixer be active, and Mic be active.

- Speaker must be able to hear the sound.
- Face to Mix and speak, speaker must be able to sound the voice form Mic.

11.5 Video signals

- There are two CVBS video signals via riser card edge con board. One is from PC tray to VT & Audio Amp module (Internal MPEG) and the other one is with opposite direction. (Frame Grabber)

  pin assignment is



- Internal MPEG signal test

  Input one CVBS at the pins, then use RMC to select the input signal source be internal MPEG (see operation manual) and press TV/PC button to TV mode, then screen must display the signal source.

  Test Criteria :

  Input Impendance : 75 Ω

  Input signal level : $1V_{p\text{-}p}$ CVBS @75Ω load

- Frame Grabber Signal Test
- Select TV/PC to TV and let there is active picture on screen.
- And connector the signal to a monitor which can accept the input of CVBS (like Philip's CM1000)
- Then the signal must appear on the screen of monitor.

  Test Criteria :

  Output Impendance : 75 Ω

  Output signal level : $1V_{p\text{-}p}$ CVBS @75Ω load

12. Audio Test Procedure

12.1 Purpose : To measure the audio amplifier to fit the specification of Topline.

12.2 Scope : The audio including the stereo amplifier, bass booster amplifier, speakers and audio switching circuit.

12.3 Equipment :

- VT & Audio Board
- Speakers
- Sound Sources
- Audio analyzer
- Oscilloscope

12.4 Block description :

- Input : AV1, AV2, SCART, and Tuner
- Switching circuit : HEF4052 x 2
- Audio processor : TDA 8425
- Audio Amplifier : TDA 2615
  TDA 2614
- Output : 3W speaker X 2
  5W speaker

12.5 Test procedures

- \Make sure the cables and wires is ready.
- Open the power, and see the POST message.
- After the message appeared, using the Remote Control unit (RC) or the Front Panel (FP) to select audio functions.
- At the RC unit (or FP), use the TV/PC key to select the mode to test. For example, select the PC mode to listen the CD music, or select the TV mode to watch TV or VCR (through the AV1 or AV2).
- Adjusting the Volume Up or Down (RC unit or FP), you can hear the sound.
- Using the Mute button (only at the RC unit), switch to mute ON/OFF.
- Using the sound button (only at the RC unit), looking the Audio On-Screen-Display function.
  You will see the functions display on the screen :
  - TREBLE
  - BASS
  - BALANCE
  - STEREO
- Using the Up or Down button to change the TREBLE, BASS, or BALANCE, or change the STEREO function from Stereo to MONO A, MONO B, MONO ! or STEREO.

- Using the Channel selector (RC unit or FP) to change the channel, you can use the DOWN button to change the channel from digital channel (tuner) to Europe (SCART CONNECTOR), AV1, AV2, and channel 99 (tuner), etc. Check every input audio source is ready.
- After test the above procedure, The audio functions are OK.
- Same procedure is testing the headphone. Plug in the headphone.

[FD 150, 200, 201 und 202]

Appendix :

- Here is the truth table of HEF4052 switching circuit.

7031(MUX 1)		7033(MUX2)	
AUSEL0	AUSEL1	-TV	OUTPUT
0	0	0	TUNER
0	1	0	SCART
1	0	0	AV1
1	1	0	AV2
X	X	1	AUDIO MIXER

- Trouble & Shooting
  1. First check the power is ready.
  2. If you found anything wrong. Check the Audio input source.
  3. If the Audio source is OK, check the 7031 (HEF4052) pin 3 and 13. There must be audio signal output.
     - If not, check the Pin 9 and 10 that match the above table. If the signal can not match the truth table, the 4052 failure.
  4. Then check the 7033 (HEF4052) pin 3 and 13. There must be audio signal output.
     - If not, check the Pin 10 that matches the above table. If the signal can not match the truth table, the 4052 failure.
  5. Next check the 7014 (TDA8425) pin 18 and 20 (audio input), then check pin 13 and 9 (audio output).
     - If you can not find the signal, check the mode select is right.
     - Maybe the volume is too small to find out.
     - If everything is OK, check the I^2C control signal is right.
  6. Check the 1015 (Front Panel's headphone) signal is OK.
     - If the 1015 pin 4 and 6 is no signal, the headphone jack may be damaged.
  7. Check the 7037 (TDA2615, Audio Amp) pin 1 and 9(input), and pin 4 and 6(output) signals are OK.
     - If not, the TDA2615 is failure.
  8. If the TDA2615 is OK, check the 3059 and 3058 (fuse), maybe the fuse is broken.
  9. If above is OK, change the speaker.
  10. Same test is about Bass Booster.
     - Check the 7302 (CXA1649) pin 2 and 7 (input) and pin 1 and 4 (output) signals are OK.
     - If not, check the pin 4 (power) is OK.
     - Check the 7301 (TDA2614, Audio Amp) pin 9(input), and pin 6(output) signals are OK.
     - If not, the TDA2614 is failure.
     - If the TDA2614 is OK, check the 3315 (fuse), maybe the fuse is broken.

  If above is OK, change the speaker.

13. Teletext Module Test Procedures

13.1 Enter teletext:

A. Enter TV mode by selecting TV/PC button of remote control keypad.
B. Select one active channel.
C. Enter teletext mode by pressing teletext button ,then page 100 is now on the screen.
(TV pattern generator with teletext option should be connected to the tuner input)

13.2 Select page number:

A. Page 100-799 can be selected by entering page number.
B. Press page up button to increase page number by one.
C. Press page down button to decrease page number by one.
D. Press enlarge button for double height enlarged character display press again to return to normal display.

13.3 Exit teletext:

A. Press teletext button to exit teletext and return to TV mode

13.4 Measurement of pin signals:

A. Pin 11,52 (VCC) : +5V
B. Pin 4,5,15,26 (VSS) : 0V
C. Pin 1 (oscout) : 0.6V Vpp,27MHz sine wave
D. Pin 16,17,18 (r,g,b) : 0.7V Vpp, video signal
E. Pin 19 (rgb ref) : 0.7V
F. Pin 6 (ref) : 5V
G. Pin 8 (black) : 2.1V
H. Pin 9 (CVBS) : 1.5V Vpp (include sync)
I. Pin 10 (iref) : 2.5V
J. Pin 12 (pol) : 5V
K. Pin 13 (Hsync) : 15.7KHz, 5V Vpp
L. Pin 14 (Vsync) : 50Hz, 5V Vpp
M. Pin 20 (blanking) : 15.7KHz+50Hz sync ,5V Vpp

[FD 150, 200, 201 und 202]

Alignment procedure of Monitor Section

0. General:

00. With Integrated PC module:

The built-in Integrated PC module with test software is recommanded to be used as signal source.

01.AC/DC Measurement:

The measurements for AC waveform and DC figure is based on 800 x 600 (37.8kHz/60Hz) mode with test pattern gray scale.

1. Power Supply Adjustment:

- Set the brightness front control 3895 and the contrast front control 3894 to minimum.
- Set the trimming pot-meters 3163/3158 in the mechanical mid-position (this is a pre-setting).
- Connect a dc voltmeter between capacitor 2157 (or pin 6 of M106) and ground. (B+ output for PC module).
- Connect a dc voltmeter between resister 3161 (or pin 10 of M107) and ground. (B+ output for deflection).
- Switch on the set.
- Apply a video signal in the 640 x 480 with 31.32kHz/60 Hz mode.
- Select the "crosshatch" pattern.
- Adjust trimming pot-meter 3158 until the dc voltmeter reads 5.1 +/- 0.02 V (pin 6 of M106).
- Adjust trimming pot-meter 3163 until the dc voltmeter reads 165.0V +/- 0.2V (pin 10 of M107).

PC section :

Load +5V/6A, +12V/2A, -12V/1A, -5V/0.3A on connector M106, adjust VR (3158) until the voltage of +5V to 5.10+/- 0.02V. Check the other voltage within the specification.

Monitor section :

Load +6V/0.65A, +13V/0.45A, +33V/0.02A, +165V/0.2A, -11V/0.2A on connector M107, adjust VR (3163) until the voltage of 165V to 165.0V+/-0.2V. Check the other voltage within the specification.

2. H osc. and B+ Alignment:

- Switch off the set.
- Floating 3821 (that is, float pin9 of IC7415 .)

Connect pin 11 of F801 to pin11 of IC 7506 with a jumper wire.
Set H-shift front control 3898 at click position.

- Switch on the set.
- Apply a video signal (e.g. crosshatch pattern) in the 640 x 480 with horizontal frequency 31.32 kHz.
- Apply oscilloscope or Frequency Counter to pin 3 of IC7415.
- Connect a dc voltmeter between capacitor C2609 and ground.
- Adjust potentiometer 3517 until the Frequency Counter reads 31.3 kHz +/- 0.1 kHz .
- Adjust potentiometer 3608 to obtain the dc voltmeter reads 81.5V +/- 0.1V .
- Apply a video signal (e.g. crosshatch pattern) in the TV mode with horizontal frequency 15.6 kHz.
- Adjust potentiometer 3452 until the Frequency Counter reads 15.6 kHz +/- 0.1 kHz .
- Adjust potentiometer 3605 to obtain the dc voltmeter reads 47.5V +/- 0.1V .
- Remove the jumper wire(connect pin 11 of F801 to pin11 of IC 7506.)
- Apply oscilloscope or frequency counter on pin 1 of F802.
- Adjust trimming pot-meter 3804 until the reading is 29 +/- 0.1 kHz.
- Switch off the set.
- recovery the resistors 3821.

[FD 150, 200, 201 und 202]

3. Picture Geometry Adjustment:

- Apply 48.9 kHz 768 lines crosshatch pattern.
- Set the brightness for visible raster.
- Set pot-meter 3621 for the correct horizontal center of the whole raster.
- The recommended alignment steps are that first proceeding in 31.32 kHz/60 Hz mode. second , proceeding in TV mode (15.6 kHz) third, proceeding in 37.5 kHz/75 Hz mode . forth, proceeding in 37.8 kHz/60 Hz mode. then, 48.9 kHz/60 Hz and 46.8 kHz/75 Hz.
- For the following setting apply a video signal (with crosshatch pattern).
- Pre-set front controls 3894,3895,3896,3897, 3898,and 3899 at click position.

31.32 kHz / 480 lines mode

Horizontal phase (3408)

- Set pot-meter 3408 for the correct horizontal phase centering.

Horizontal width (3850)

- Adjust pot-meter 3850 for a picture width of 260 mm.

Vertical centering (3534)
- Adjust pot-meter 3534 for the correct vertical centering.

Vertical height (3488)
- Adjust pot-meter 3488 for a picture height of 195 mm.

East-West correction (3853)
Adjust pot-meter 3853 until the vertical lines on the left and right sides of the screen are as straight as possible.

Unbalance Pincushion (3824)
- Adjust pot-meter 3824 until the vertical lines on the left and right sides of the screen are as straight as possible.

Keystone Adjustment (3859)
-Adjust pot-meter 3859 until the vertical lines on the left and right sides of the screen are as straight as possible.

Unbalance Keystone (3860)
-Adjust pot-meter 3860 until the vertical lines on the left and right sides of the screen are as straight as possible.

TV mode (15.6 kHz)
Horizontal phase centering (3402)
- Adjust pot-meter 3402 for the correct horizontal phase centering.

Horizontal width (3401)
- Adjust pot-meter 3401 for a picture width of 260 mm.

37.5 kHz/ 480 lines
Horizontal phase centering (3414)
- Adjust pot-meter 3414 for the correct horizontal phase centering.

Horizontal width (3412)
- Adjust pot-meter 3412 for a picture width of 260 mm.

37.8 kHz/ 600 lines
Horizontal phase centering (3420)
- Adjust pot-meter 3420 for the correct horizontal phase centering.

Horizontal width (3418)
- Adjust pot-meter 3418 for a picture width of 260 mm.

48.9 kHz/ 768 lines
Horizontal phase centering (3426)
- Adjust pot-meter 3426 for the correct horizontal phase centering.

Horizontal width (3424)
- Adjust pot-meter 3424 for a picture width of 260 mm.

46.8 kHz/ 600 lines
Horizontal phase centering (3432)
- Adjust pot-meter 3402 for the correct horizontal phase centering.

Horizontal width (3430)
- Adjust pot-meter 3401 for a picture width of 260 mm.

4. White point adjustment:

* VG2 (bottom knob on the line output transformer).
* Cut-off points of the picture tube (3741, 3771, 3711).
* White "D" (3763, 3703).

- Pre-set gain control pot-meter 3763, 3703 of the mid-position, cut-off control pot-meter 3741, 3771, and 3711 fully clockwise, sub-contrast control pot-meter 3820 and ABL control pot-meter 3630 also should be at center position as well.
- Apply a video signal (black) in the 640 x 480 with 31.32kHz / 60 Hz.
- Set brightness front control 3895 at click position.
- Set contrast front control 3894 to maximum.
- Set VG2 pot-meter (on the line output transformer) to minimum.

- Adjust VG2 pot-meter to increase VG2 until any colour amount red, green, and blue becomes "just visible".
- Adjust pot-meters of the "two remaining" colours (3741, 3771, 3711) to the same liht output level, so that an optimal background (raster) colour is obtained.
- Adjust brightness front control 3895 to maximum for double-checking the background (raster) colour.

- Apply "full white pattern"
- Set brightness front control 3895 to click position, contrast front control 3894 to maximum and sub-contrast control 3820 and ABL 3630 to mid-position.
- Adjust pot-meters 3763 and 3703, so that an optimal display colour (White "D") is obtained.

- Adjust text pattern, and adjust sub-contrast 3820 for clear characters without blooming.
- Apply full white pattern, set brightness and contrast at maximum and adjust ABL 3630 for line output which does not affect top side picture geometry.
- Adjust contrast front control 3894 to maximum, for double-checking the displayed colour.

5. optimal focus setting:

- Apply a video signal ("M" or "@" characters) in the 1024 x 768 with 48.9 kHz/60 Hz mode.
- Set brightness front control 3895 at click position and contrast front control 3894 to maximum.
- Adjust focus pot-meter (top knob on the line output transformer) so that the picture at 2/3 of the diagonal lines (from center to four corners) of this displayed screen is as sharp as possible.

6. VT Card

introduction:

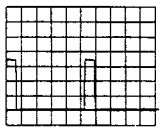
This alignment procedure is going to make sure the correct AFC voltage output when tuner in tunning.

procedure:

set PM5418 frequency 48.25 MHz, color bar pattern, PAL B/G/H and RF output 3 mv.
connect RF connector to VT Board, and power on.
press remote control key '1'.
tune 5001 of teletext daughter board.
measure 3026 of VT board until 2.9V +- 0.1V.

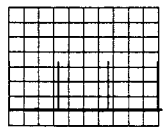
Voltage & Signal Charts

A1 M301-1



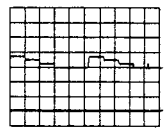
1V/DIV AC
5US/DIV

A2 M301-2



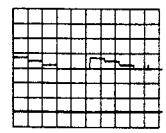
1V/DIV AC
5MS/DIV

A3 7731-2



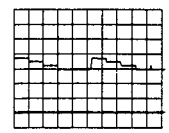
1V/DIV AC
5US/DIV

A4 7731-5



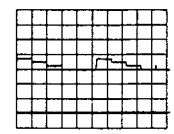
1V/DIV AC
5US/DIV

A5 7731-8



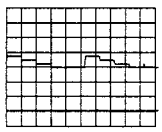
1V/DIV AC
5US/DIV

A6 7301-E



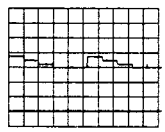
1V/DIV AC
5US/DIV

A7 7331-E



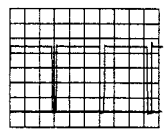
1V/DIV AC
5US/DIV

A8 7361-E



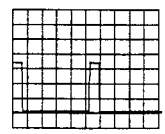
1V/DIV AC
5US/DIV

A9 M301-10



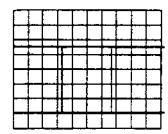
1V/DIV AC
20US/DIV

A10 7381-E



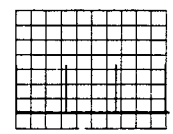
1V/DIV AC
5US/DIV

A11 M301-12



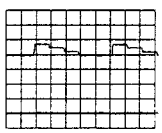
1V/DIV AC
5MS/DIV

A12 7391-E



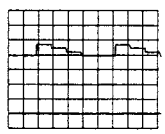
1V/DIV AC
5MS/DIV

A13 7302-B



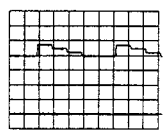
1V/DIV AC
5US/DIV

A14 7332-B



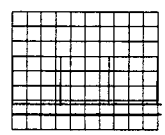
1V/DIV AC
5US/DIV

A15 7362-B



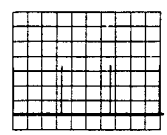
1V/DIV AC
5US/DIV

A16 7392-B



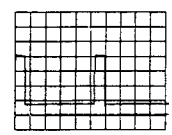
1V/DIV AC
5MS/DIV

A17 M701-9



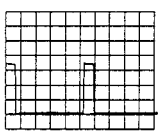
1V/DIV AC
5MS/DIV

A18 7382-B



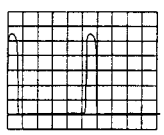
1V/DIV AC
5US/DIV

A19 M701-7



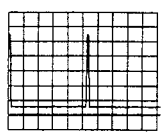
1V/DIV AC
5US/DIV

A20 7731-9



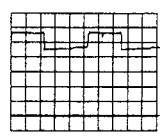
1V/DIV AC
5US/DIV

A21 7731-10



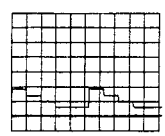
1V/DIV AC
5US/DIV

A22 7731-12



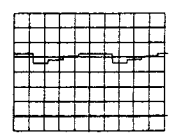
1V/DIV AC
5US/DIV

A23 7731-13



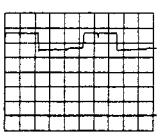
1V/DIV AC
5US/DIV

A24 7731-14



1V/DIV AC
5US/DIV

A25 7731-15

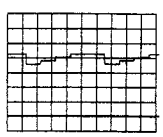


1V/DIV AC
5US/DIV

A26 7731-16

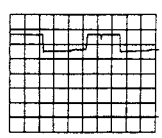
1V/DIV AC
5US/DIV

A27 7731-17



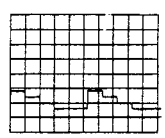
1V/DIV AC
5US/DIV

A28 7731-18



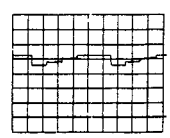
1V/DIV AC
5US/DIV

A29 7731-19



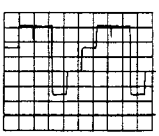
1V/DIV AC
5US/DIV

A30 7731-20



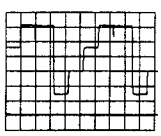
1V/DIV AC
5US/DIV

A31 7721-C



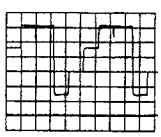
10V/DIV AC
5US/DIV

A32 7711-C



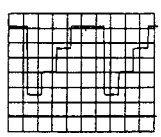
10V/DIV AC
5US/DIV

A33 7701-C



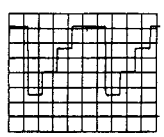
10V/DIV AC
5US/DIV

A34 7722-E



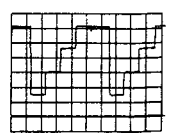
10V/DIV AC
5US/DIV

A35 7712-E



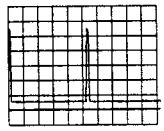
10V/DIV AC
5US/DIV

A36 7702-E



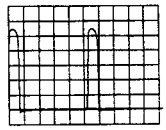
10V/DIV AC
5US/DIV

A37 M702-6



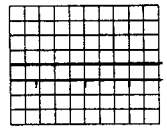
1V/DIV AC
5US/DIV

A38 M702-7



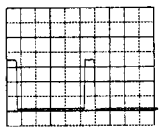
1V/DIV AC
5US/DIV

A39 M702-8



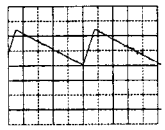
50V/DIV AC
5MS/DIV

B1 F801-11



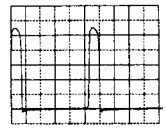
1V/DIV AC
5US/DIV

B2 7415-19



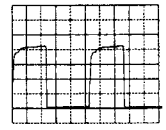
1V/DIV AC
5US/DIV

B3 7415-2



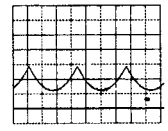
1V/DIV AC
5US/DIV

B4 7415-3



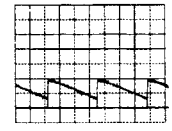
2V/DIV AC
5US/DIV

B5 7415-11



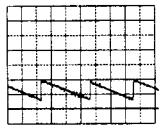
1V/DIV AC
5MS/DIV

B6 7415-6



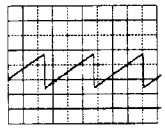
.5V/DIV AC
5MS/DIV

B7 7415-7



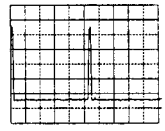
.5V/DIV AC
5MS/DIV

B8 7415-16



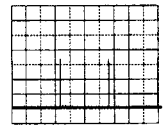
1V/DIV AC
5MS/DIV

B9 7415-8



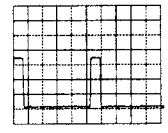
1V/DIV AC
5US/DIV

B10 7415-10



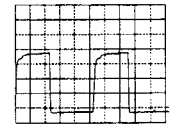
1V/DIV AC
5MS/DIV

B11 7415-9



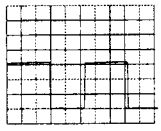
1V/DIV AC
5US/DIV

B12 7808-G



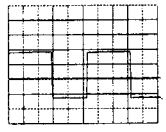
2V/DIV AC
5US/DIV

B13 7808-D



50V/DIV AC
5US/DIV

B14 6801-A

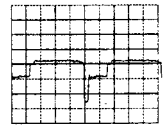


50V/DIV AC
5US/DIV

B15 5603-2

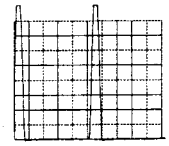
2V/DIV AC
5US/DIV

B16 7609-B



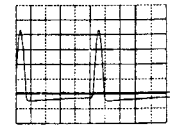
5V/DIV AC
5US/DIV

B17 7609-C



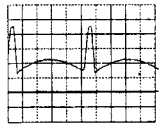
.1KV/DIV AC
5US/DIV

B18 3634



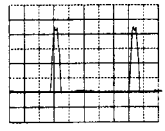
10V/DIV AC
5US/DIV

B19 M602-2



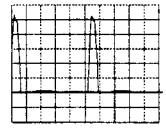
50V/DIV AC
5US/DIV

B20 7619-D



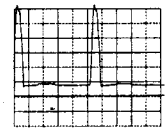
20V/DIV AC
5US/DIV

B21 7619-S



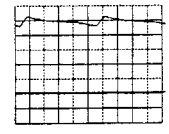
20V/DIV AC
5US/DIV

B22 7619-G



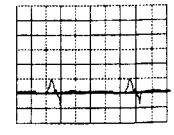
20V/DIV AC
5US/DIV

B23 7620-C



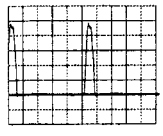
10V/DIV AC
5US/DIV

B24 7620-B



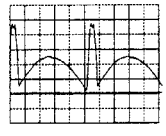
.5V/DIV AC
5US/DIV

B25 7621-G



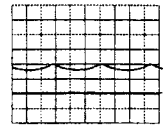
20V/DIV AC
5US/DIV

B26 7621-D



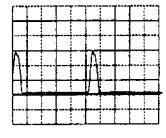
20V/DIV AC
5US/DIV

B27 7614-C



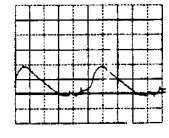
5V/DIV AC
5MS/DIV

B28 7617-D



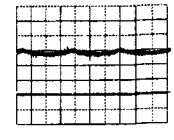
20V/DIV AC
5US/DIV

B29 7614-B



1V/DIV AC
5US/DIV

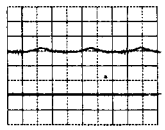
B30 7610-B



1V/DIV AC
5MS/DIV

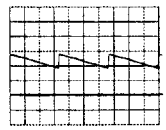
[FD 150, 200, 201 und 202]

B31 7813-B



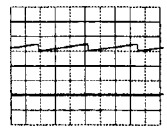
1V/DIV AC
5MS/DIV

B32 7812-B



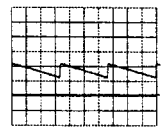
1V/DIV AC
5MS/DIV

B33 7812-C



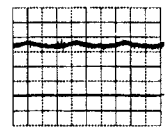
2V/DIV AC
5MS/DIV

B34 7812-E



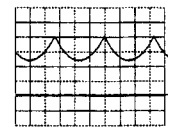
1V/DIV AC
5MS/DIV

B35 7813-E



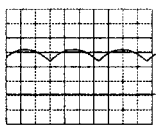
1V/DIV AC
5MS/DIV

B36 7807-B



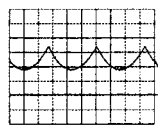
1V/DIV AC
5MS/DIV

B37 7807-C



2V/DIV AC
5MS/DIV

B38 7807-E

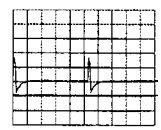


1V/DIV AC
5MS/DIV

B39 7601-4

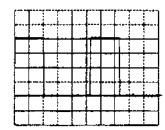
2V/DIV AC
5US/DIV

B40 7601-5



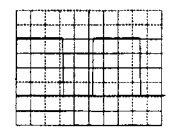
2V/DIV AC
5US/DIV

B41 7601-9



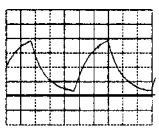
2V/DIV AC
5US/DIV

B42 7601-10



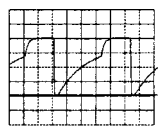
2V/DIV AC
5US/DIV

B43 7601-12



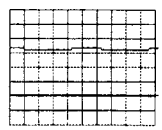
2V/DIV AC
5US/DIV

B44 7601-14



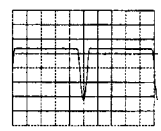
2V/DIV AC
5US/DIV

B45 7605-G



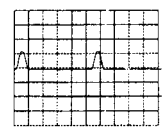
50V/DIV AC
5US/DIV

B46 5601-7



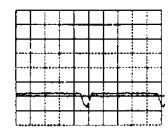
50V/DIV AC
5US/DIV

B47 5601-8



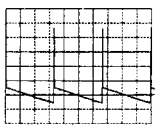
50V/DIV AC
5US/DIV

B48 5601-10



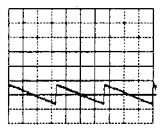
.1V/DIV AC
5US/DIV

B49 7509-5



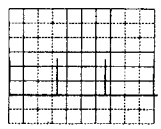
10V/DIV AC
5MS/DIV

B50 M602-4



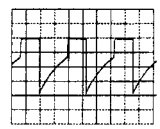
1V/DIV AC
5MS/DIV

B51 7509-9



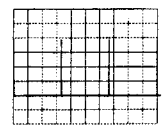
5V/DIV AC
5MS/DIV

B52 7506-2



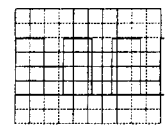
2V/DIV AC
5MS/DIV

B53 7506-4



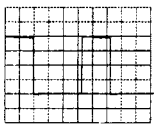
2V/DIV AC
5MS/DIV

B54 7506-6



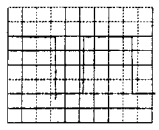
2V/DIV AC
5MS/DIV

B55 7506-9



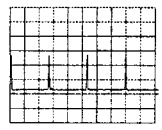
2V/DIV AC
5US/DIV

B56 7506-10



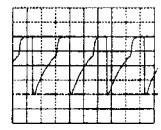
2V/DIV AC
5US/DIV

B57 7506-12



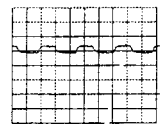
2V/DIV AC
10US/DIV

B58 7506-14



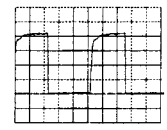
2V/DIV AC
10US/DIV

B59 7801-5



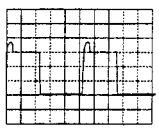
2V/DIV AC
10US/DIV

B60 7801-14



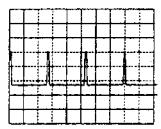
2V/DIV AC
5US/DIV

B61 7803-E



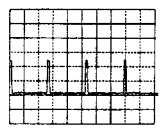
2V/DIV AC
5US/DIV

B62 7805-B



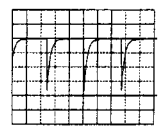
1V/DIV AC
10US/DIV

B63 7805-E



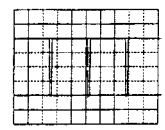
1V/DIV AC
10US/DIV

B64 7802-2



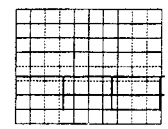
2V/DIV AC
10US/DIV

B65 7802-7



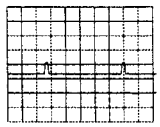
2V/DIV AC
10US/DIV

B66 7503-C



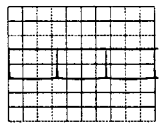
10V/DIV AC
5MS/DIV

B67 7501-E



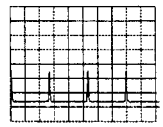
1V/DIV AC
5US/DIV

B68 7502-C



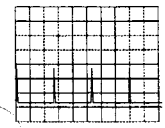
5V/DIV AC
5MS/DIV

B69 7501-B



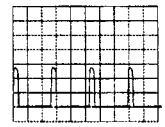
2V/DIV AC
10US/DIV

B70 F801-6



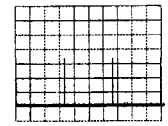
2V/DIV AC
10US/DIV

B71 F801-7



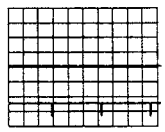
2V/DIV AC
10US/DIV

B72 F801-12



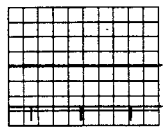
1V/DIV AC
5MS/DIV

B73 M401-6



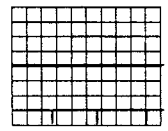
20V/DIV AC
5MS/DIV

B74 M401-7



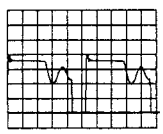
20V/DIV AC
5MS/DIV

M75 M401-8



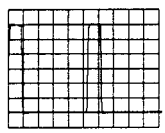
20V/DIV AC
5MS/DIV

C1 7101-D



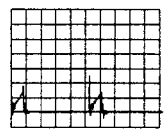
.1KV/DIV AC
5US/DIV

C2 7101-G



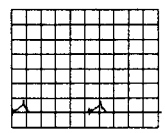
2V/DIV AC
5US/DIV

C3 7101-S



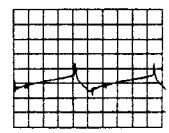
.5V/DIV AC
5US/DIV

C4 7105-3



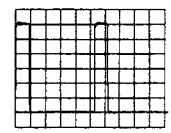
1V/DIV AC
5US/DIV

C5 7105-4



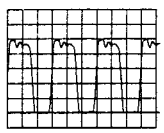
1V/DIV AC
5US/DIV

C6 7105-6



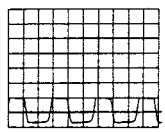
2V/DIV AC
5US/DIV

C7 5105-7



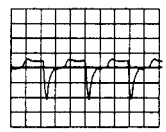
.1KV/DIV AC
5US/DIV

C8 5105-9



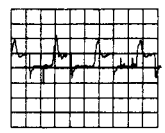
10V/DIV AC
5US/DIV

C9 7202-B



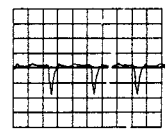
2V/DIV AC
5US/DIV

C10 7202-E



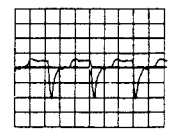
.2V/DIV AC
5US/DIV

C11 7204-B



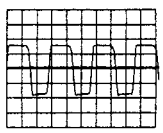
2V/DIV AC
5US/DIV

C12 7204-C



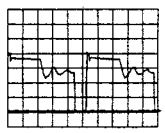
2V/DIV AC
5US/DIV

C13 5105-10



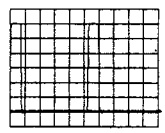
10V/DIV AC
5US/DIV

C14 7112-D



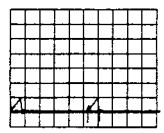
.1KV/DIV AC
5US/DIV

C15 7112-G



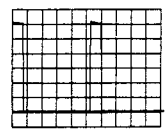
2V/DIV AC
5US/DIV

C16 7112-S



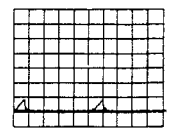
.5V/DIV AC
5US/DIV

C17 7111-6



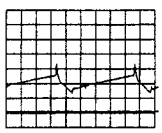
2V/DIV AC
5US/DIV

C18 7111-3



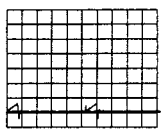
.5V/DIV AC
5US/DIV

C19 7111-4



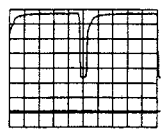
1V/DIV AC
5US/DIV

C20 7134-B



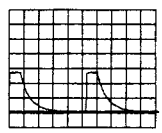
.5V/DIV AC
5US/DIV

C21 7128-C



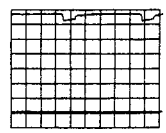
2V/DIV AC
5US/DIV

C22 7129-C



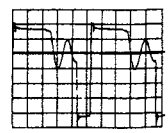
5V/DIV AC
5US/DIV

C23 7129-B



2V/DIV AC
5US/DIV

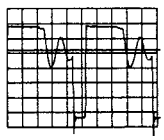
C24 5103-1



10V/DIV AC
5US/DIV

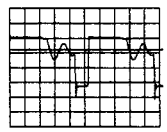
[FD 150, 200, 201 und 202]

C25 5103-8



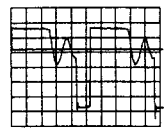
.1KV/DIV AC
5US/DIV

C26 5103-4



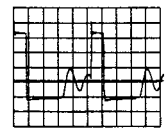
.1KV/DIV AC
5US/DIV

C27 5103-3



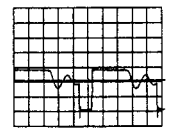
10V/DIV AC
5US/DIV

C28 5103-2



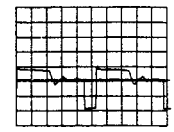
10V/DIV AC
5US/DIV

C29 5103-7



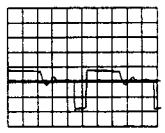
10V/DIV AC
5US/DIV

C30 4104-9



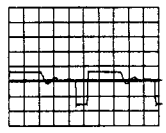
50V/DIV AC
5US/DIV

C31 5104-8



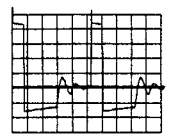
20V/DIV AC
5US/DIV

C32 5104-4



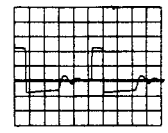
10V/DIV AC
5US/DIV

C33 5104-3



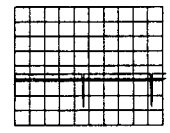
10V/DIV AC
5US/DIV

C34 5104-2



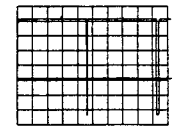
10V/DIV AC
5US/DIV

C35 7305-2



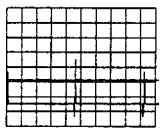
2V/DIV AC
2MS/DIV

C36 7305-3



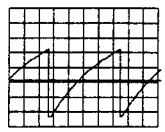
2V/DIV AC
2MS/DIV

C37 7305-4



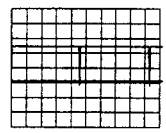
2V/DIV AC
2MS/DIV

C38 7305-6



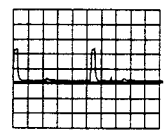
2V/DIV AC
2MS/DIV

C39 7301-C



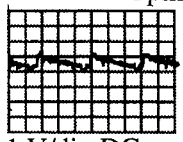
5V/DIV AC
2MS/DIV

C40 7124-B



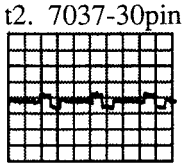
1V/DIV AC
5US/DIV

t1. 7037-15pin



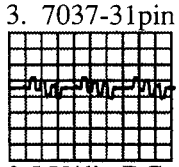
1 V/div DC
20 us/div

t2. 7037-30pin



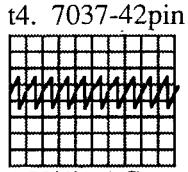
0.5 V/div DC
20 us/div

3. 7037-31pin



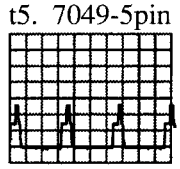
0.5 V/div DC
20 us/div

t4. 7037-42pin



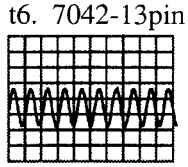
1 V/div AC
20 ms/div

t5. 7049-5pin



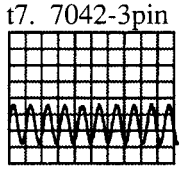
2 V/div DC
20 us/div

t6. 7042-13pin



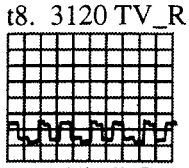
0.5 V/div AC
1 ms/div

t7. 7042-3pin



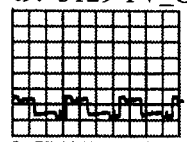
0.5 V/div AC
1 ms/div

t8. 3120 TV_R



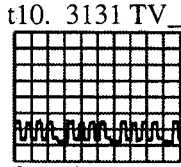
0.5V/div DC
20us/div

t9. 3129 TV_G



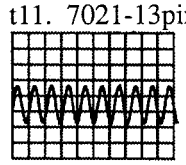
0.5V/div DC
20us/div

t10. 3131 TV_B



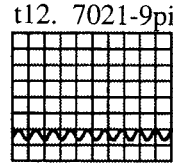
0.5V/div DC
20us/div

t11. 7021-13pin



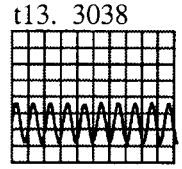
0.5V/div DC
1ms/div

t12. 7021-9pin



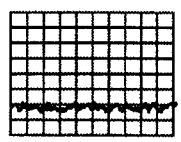
0.5V/div AC
1ms/div

t13. 3038



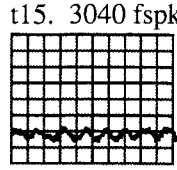
0.1V/div AC
1ms/div

t14. 3006 fbsspkr



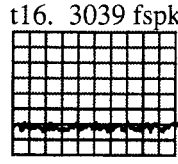
50mV/div AC
0.5ms/div

t15. 3040 fspkr-L



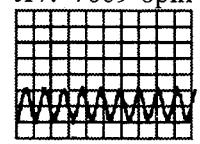
50mV/div AC
0.5ms/div

t16. 3039 fspkr-R



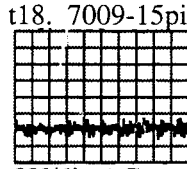
0.2V/div AC
20us/div

t17. 7009-8pin



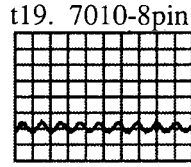
0.2V/div AC
1ms/div

t18. 7009-15pin



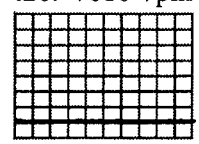
2V/div AC
1ms/div

t19. 7010-8pin AF1



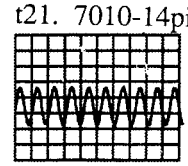
1V/div AC
1ms/div

t20. 7010-7pin



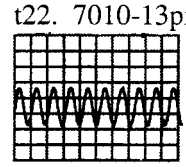
1V/div AC
0.5us/div

t21. 7010-14pin



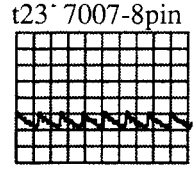
1V/div AC
1ms/div

t22. 7010-13pin



1V/div AC
1ms/div

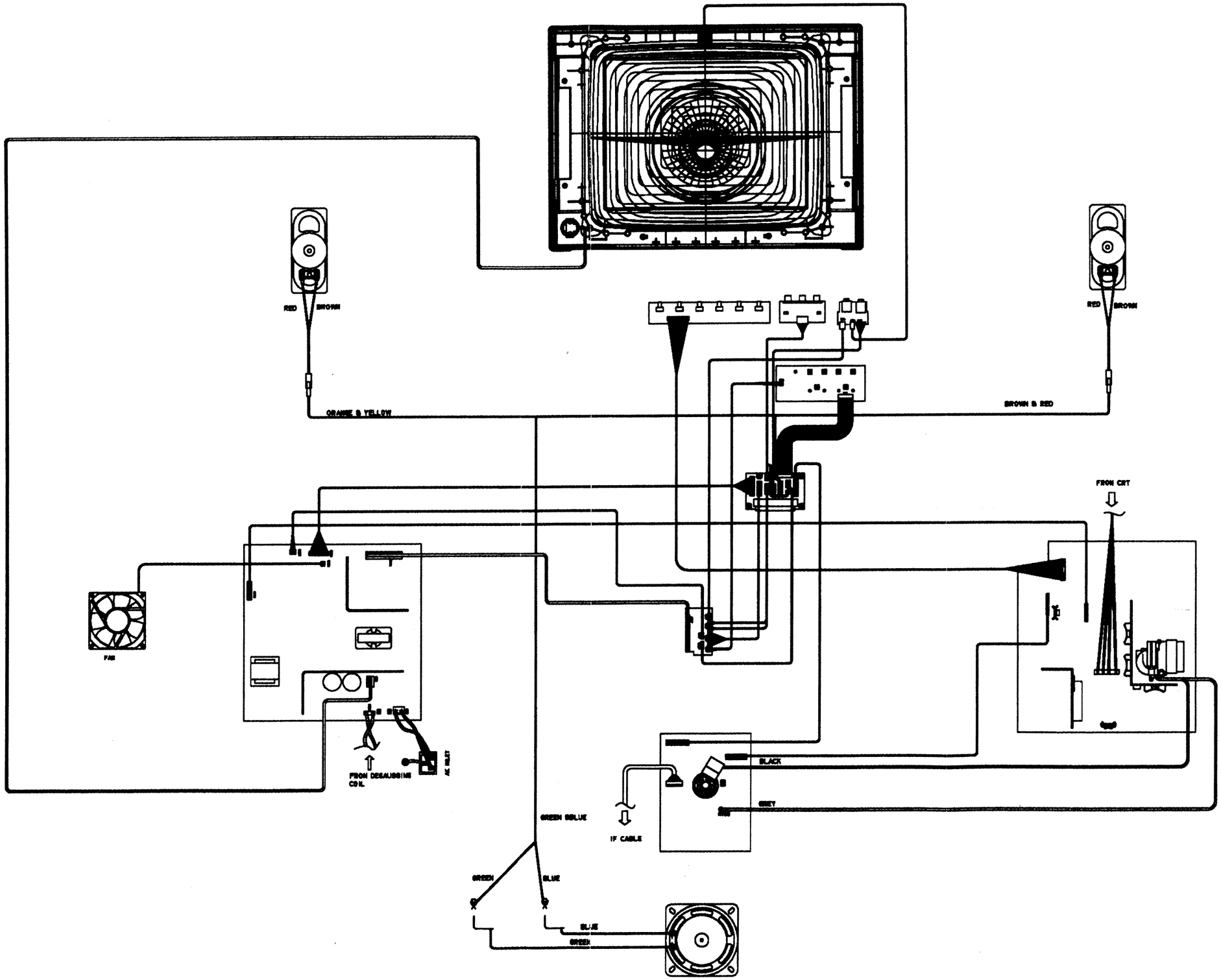
t23 7007-8pin



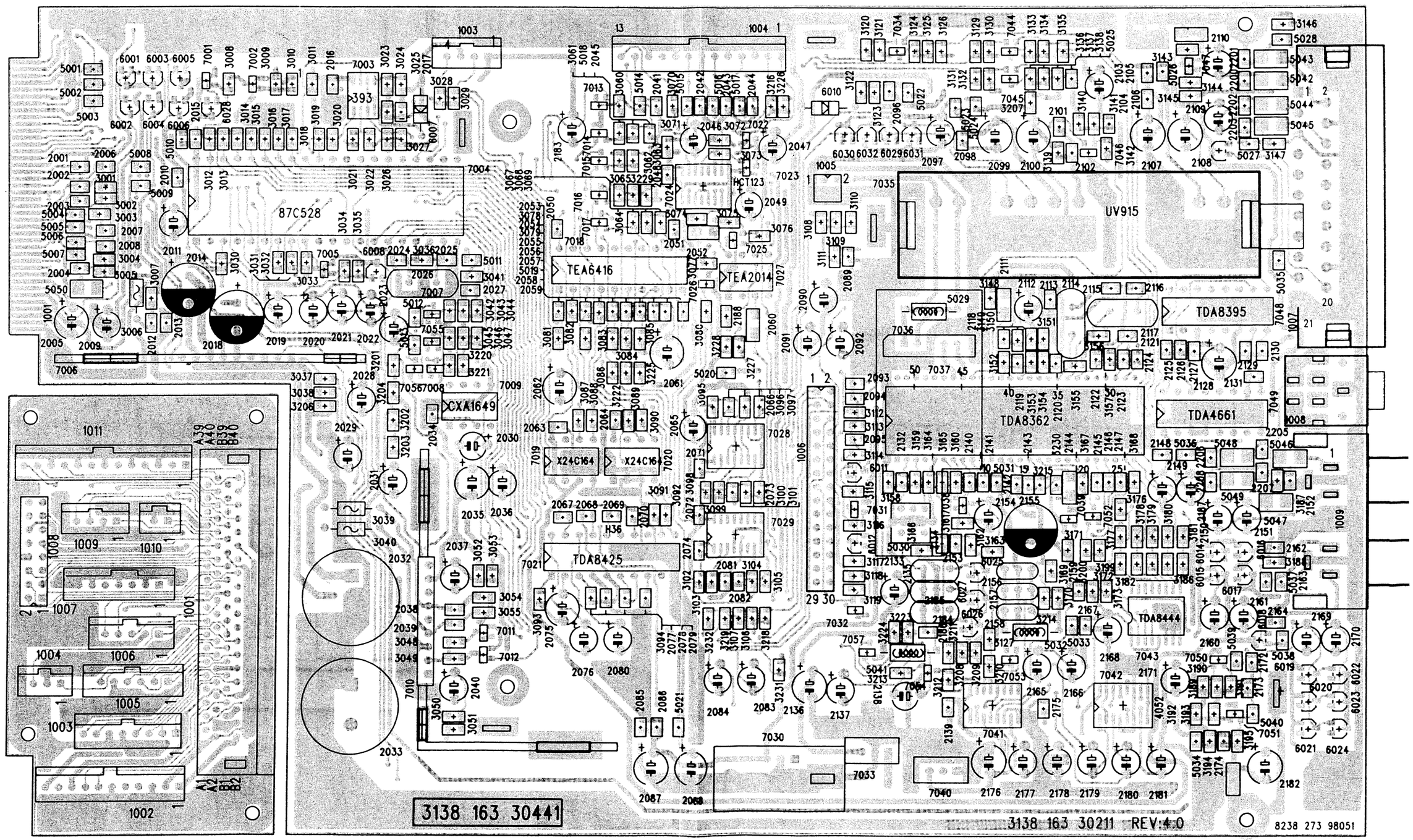
1V/div AC
20us/div

[FD 150, 200, 201 und 202]

Monitor Section Wiring Diagram

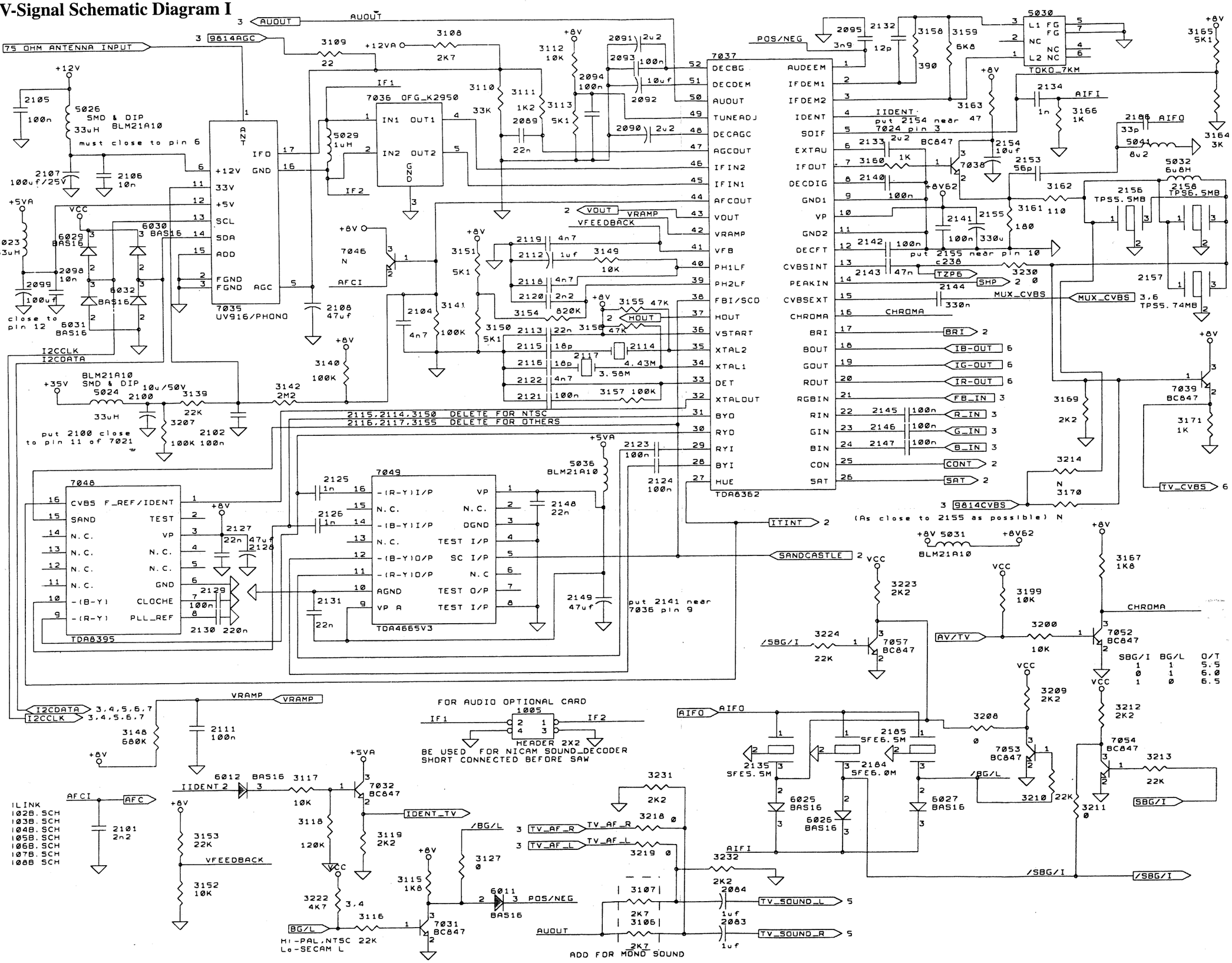


TV-Signal P.C.B. Component Diagram



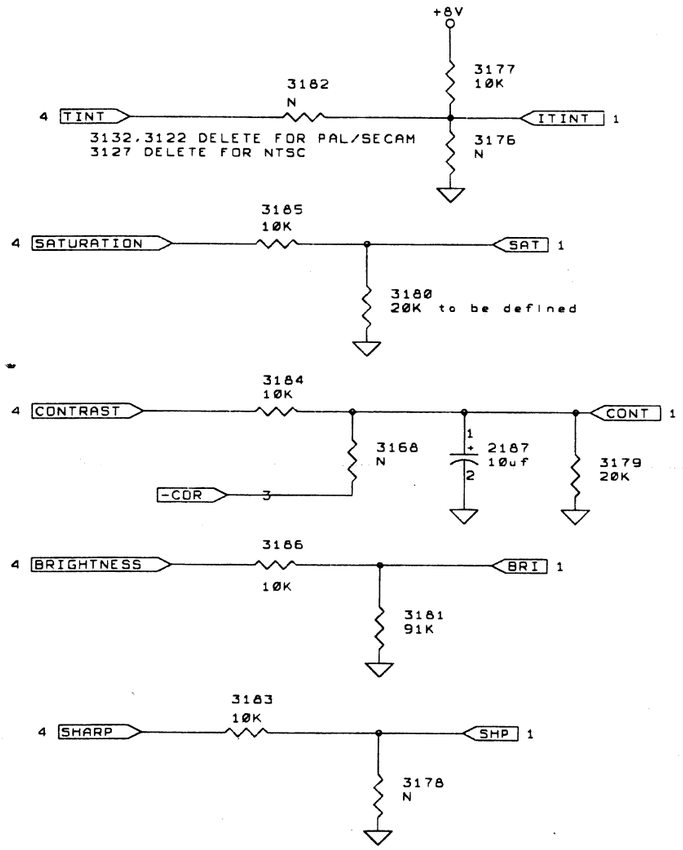
SILK SCREEN

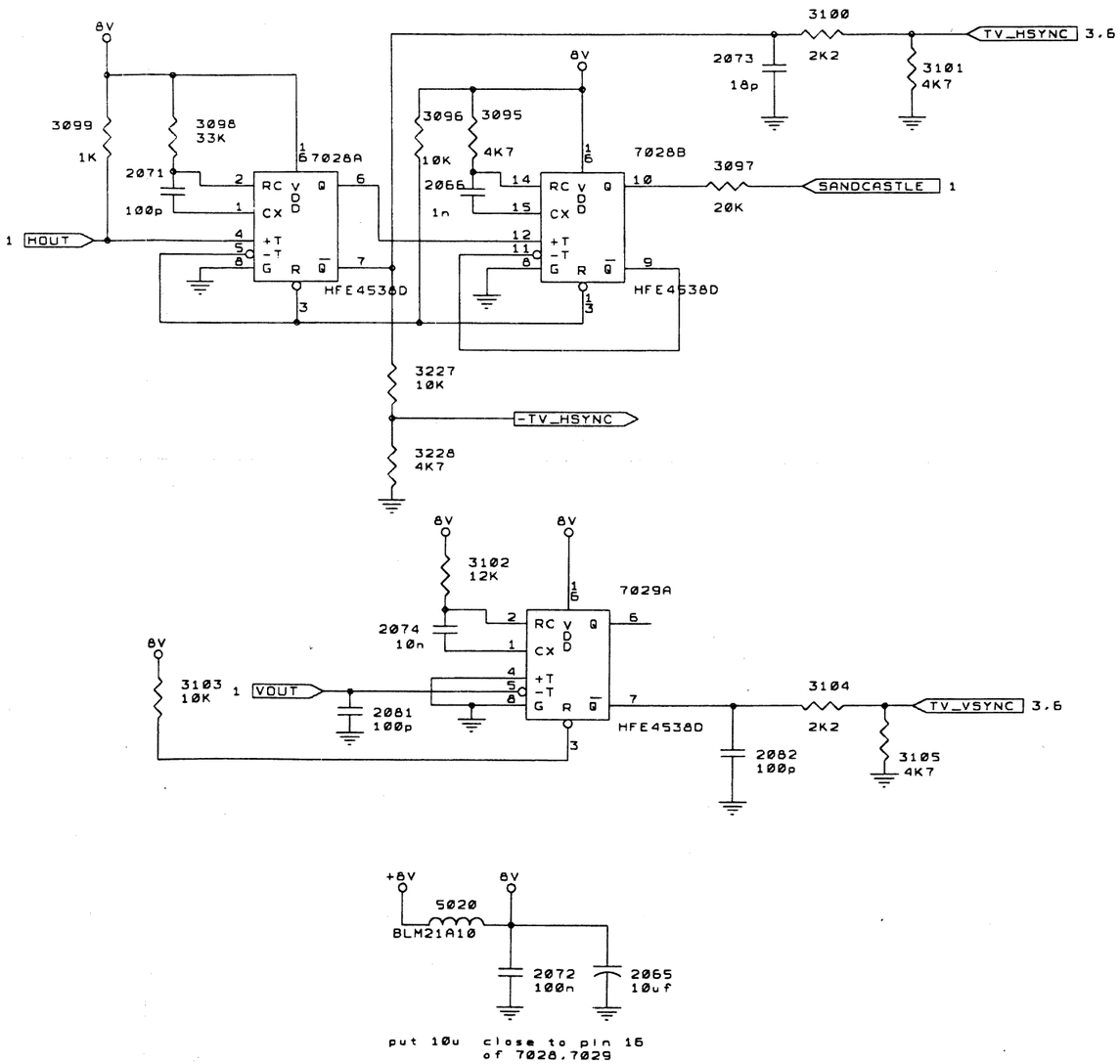
TV-Signal Schematic Diagram I



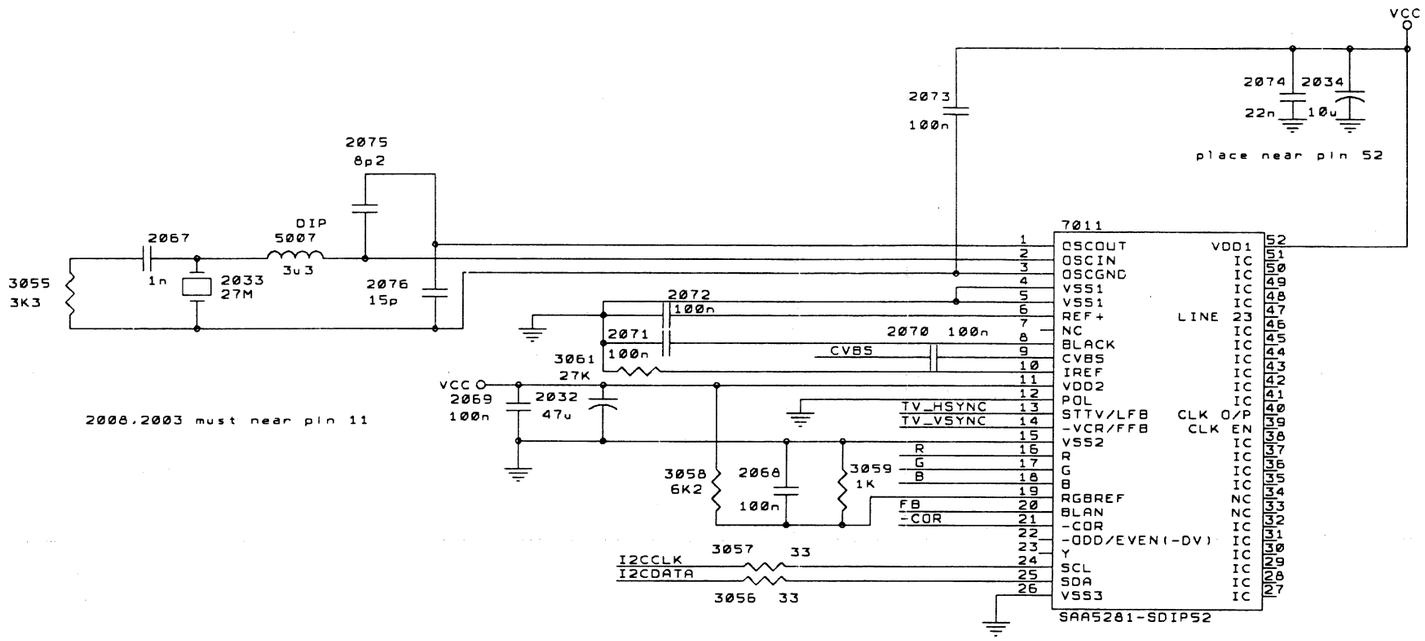
[FD 150, 200, 201 und 202]

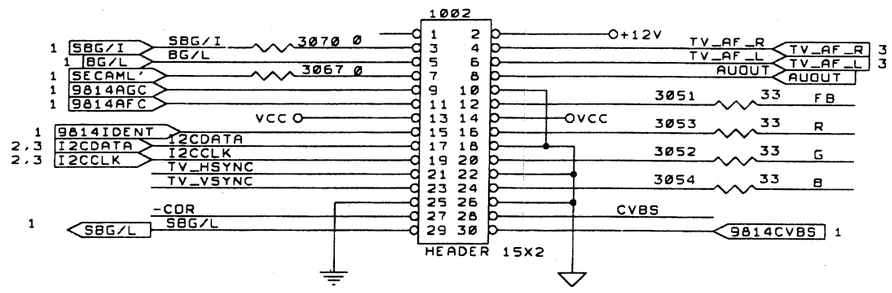
TV-Signal Schematic Diagram II





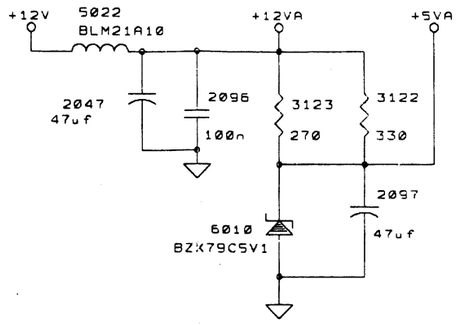
Teletext Decoder Schematic Diagram

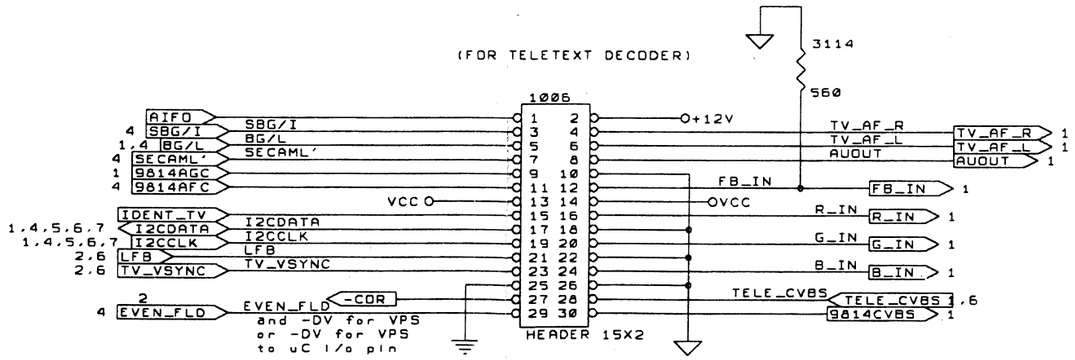




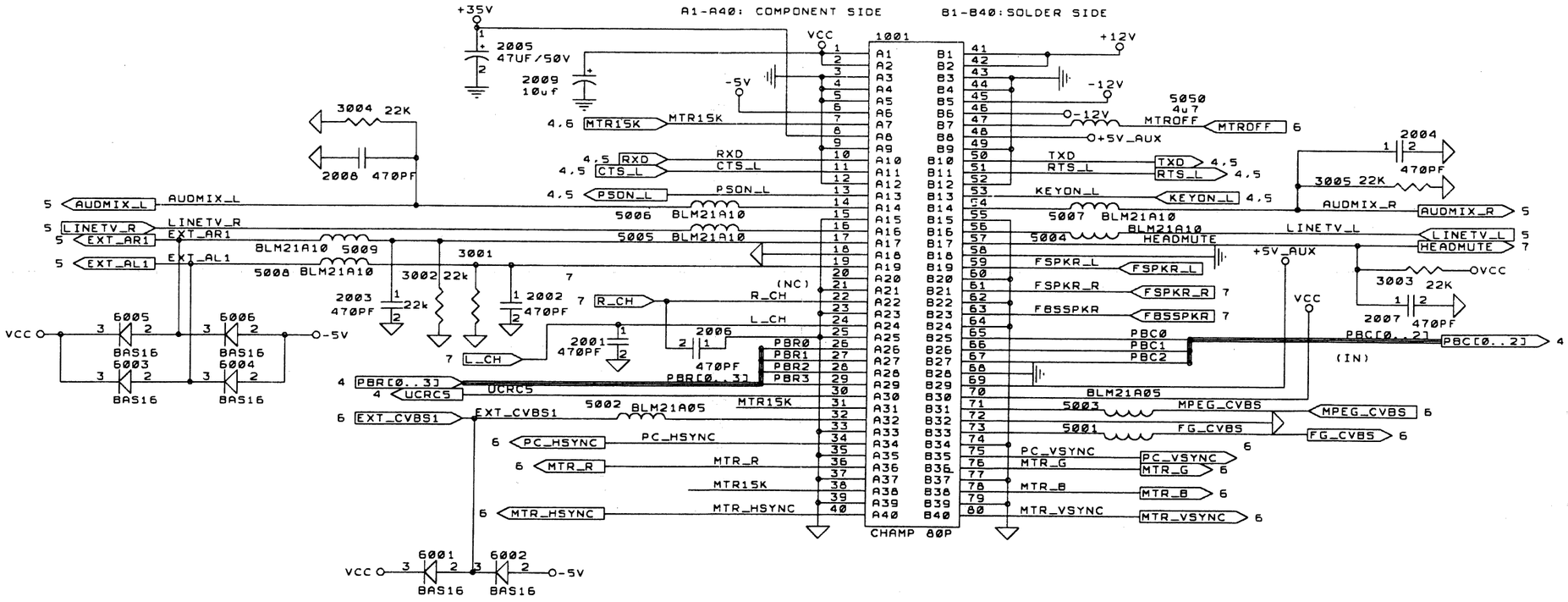
[FD 150, 200, 201 und 202]

Teletext Decoder Interface Schematic Diagram



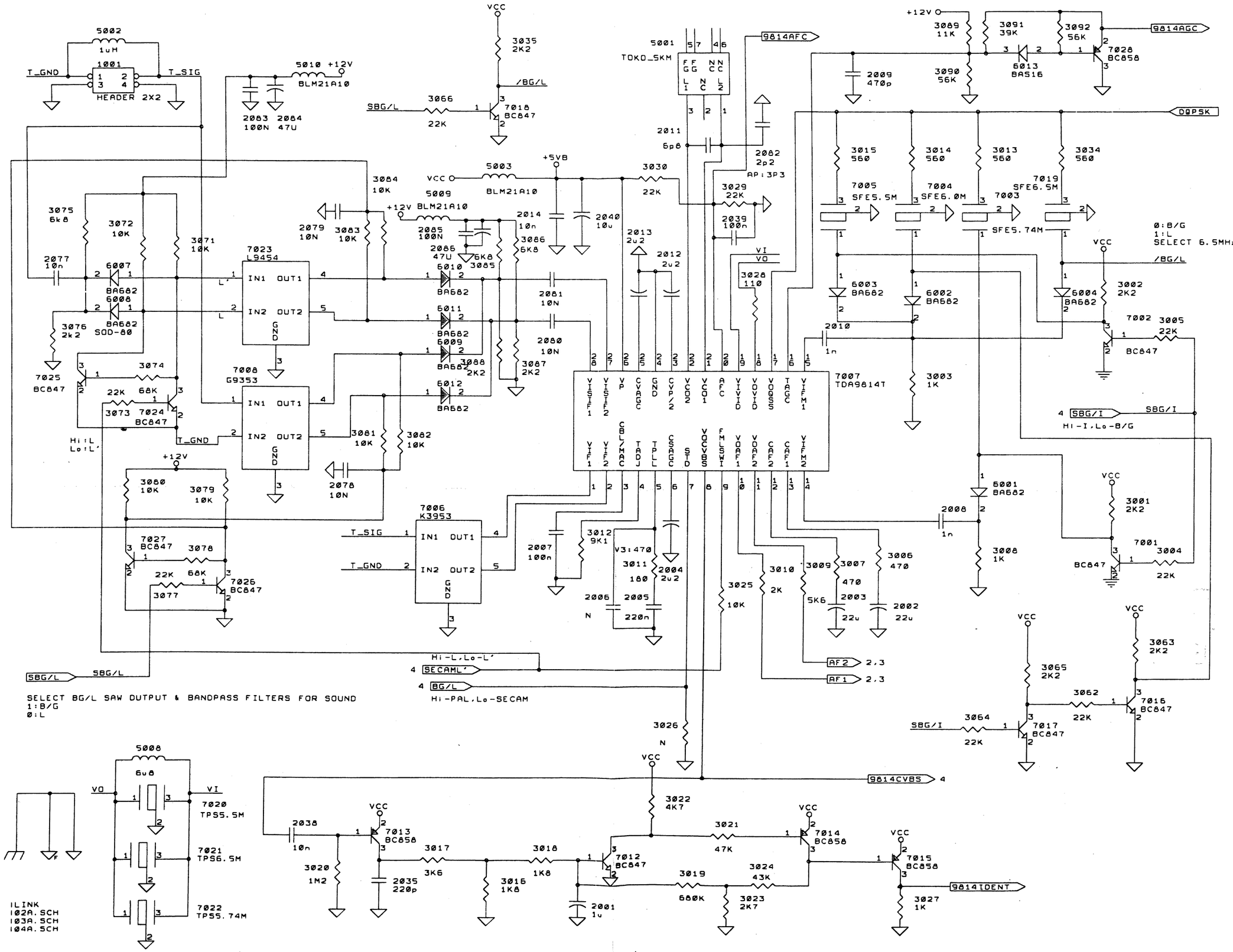


VT & Audio Amp. Connector Schematic Diagram

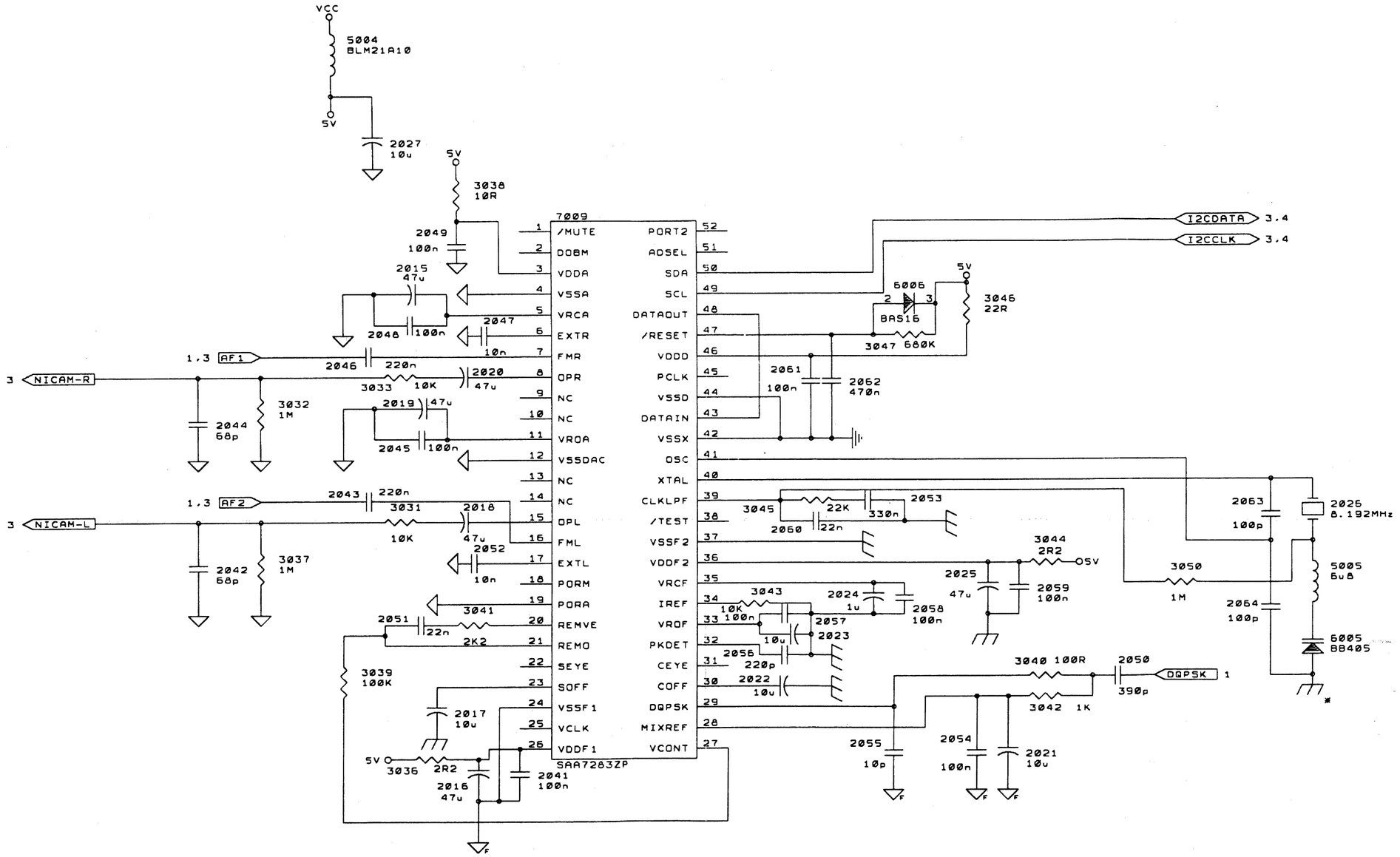


[FD 150, 200, 201 und 202]

Sound IF Schematic Diagram

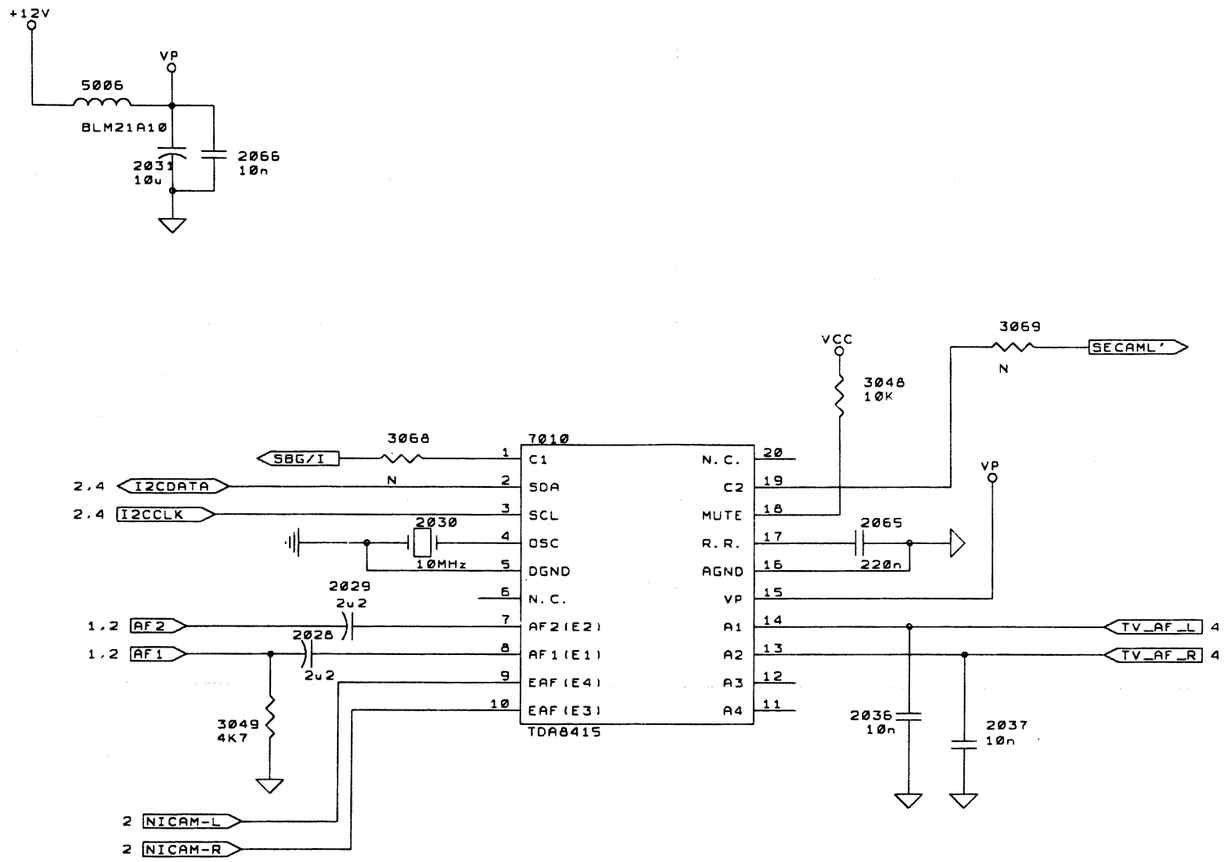


Nicam Schematic Diagram

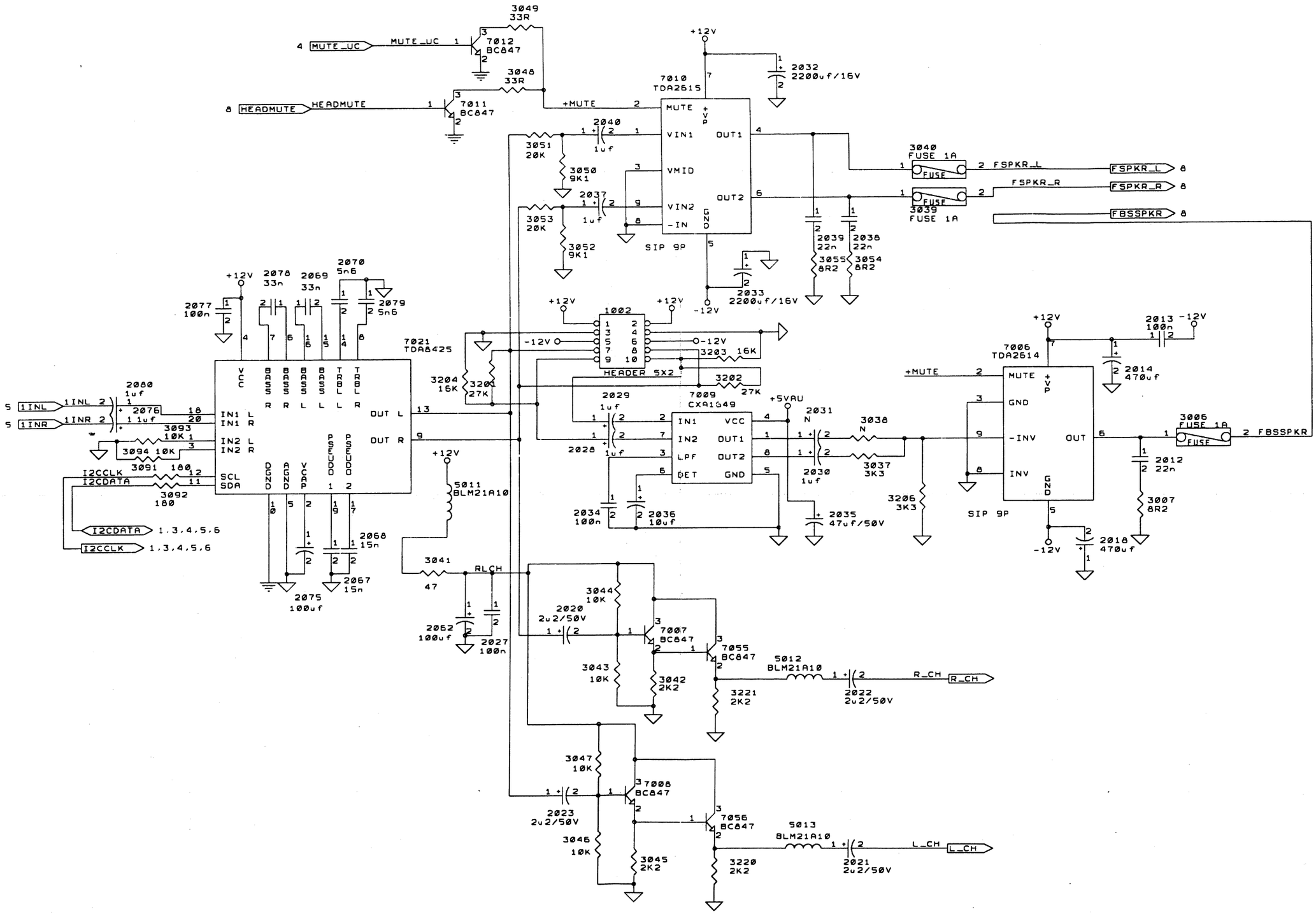


[FD 150, 200, 201 und 202]

Two Carrier Sound Schematic Diagram

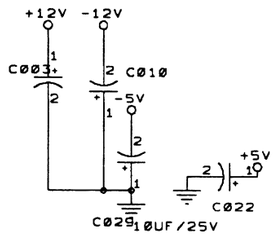


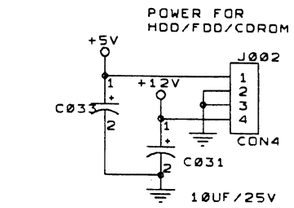
Audio, Headphone & Bass Booster Schematic Diagram



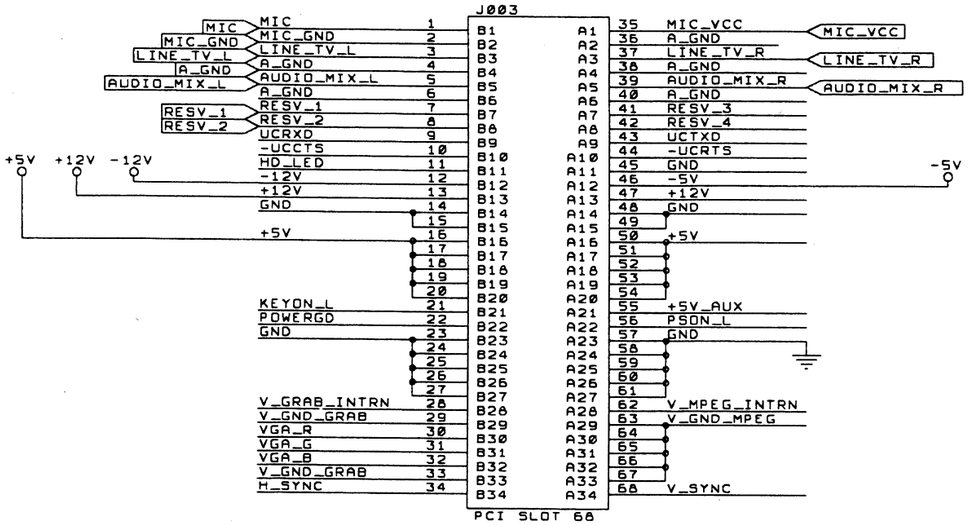
[FD 150, 200, 201 und 202]

Aux Connector & Front Panel Interface

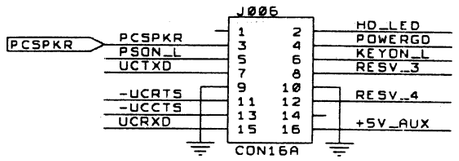




Driver Power Connector (right side)



Auxiliary Connector

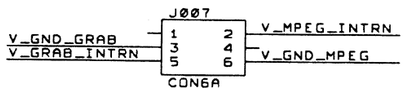


Connector Type :

Standard Pin Header "Straight"

(SNI: V26827-B470-V16)

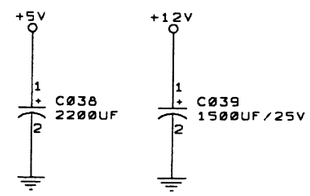
Auxiliary Video Connector



Connector Type :

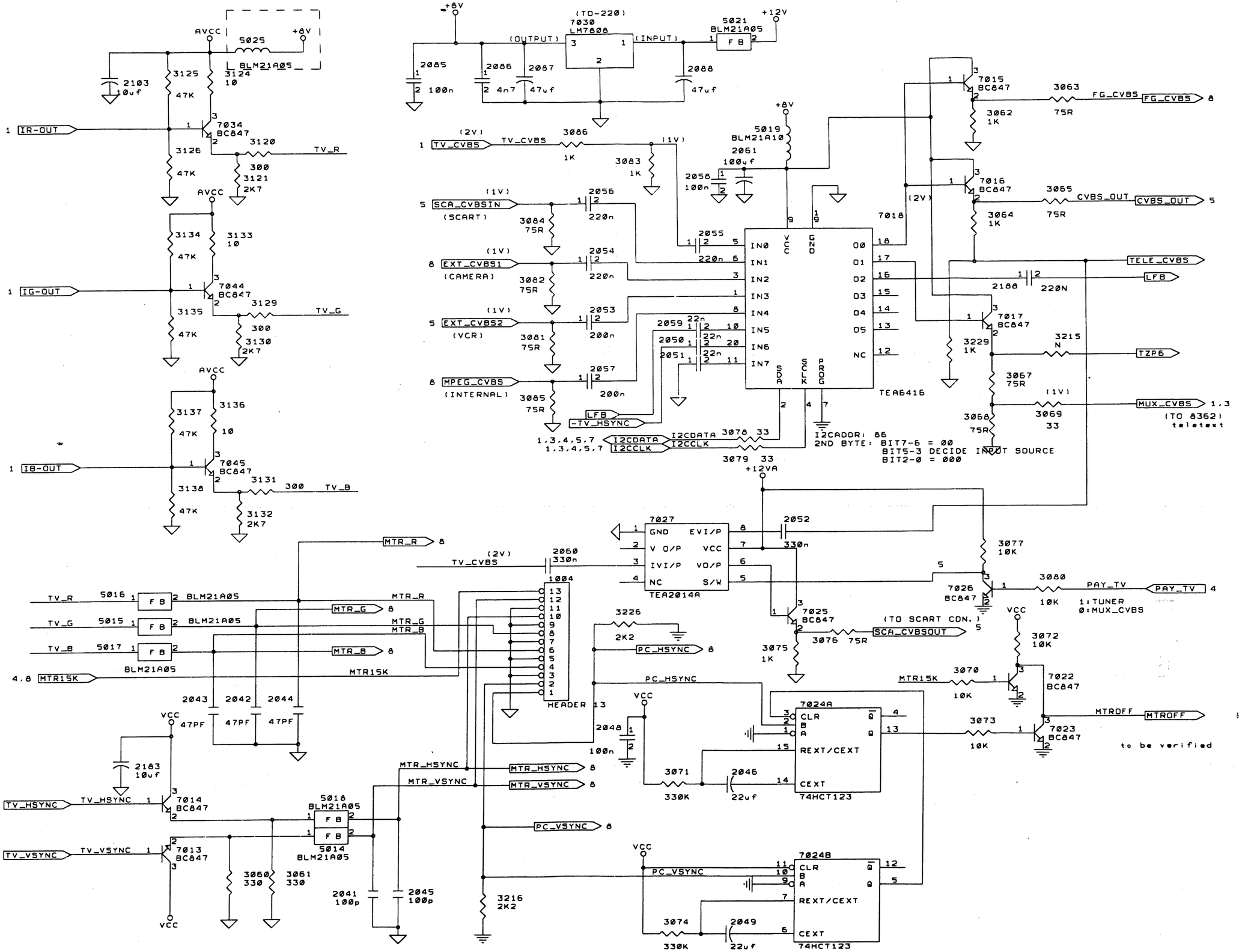
Standard Pin Header "Straight"

(SNI: V26827-B470-V206)

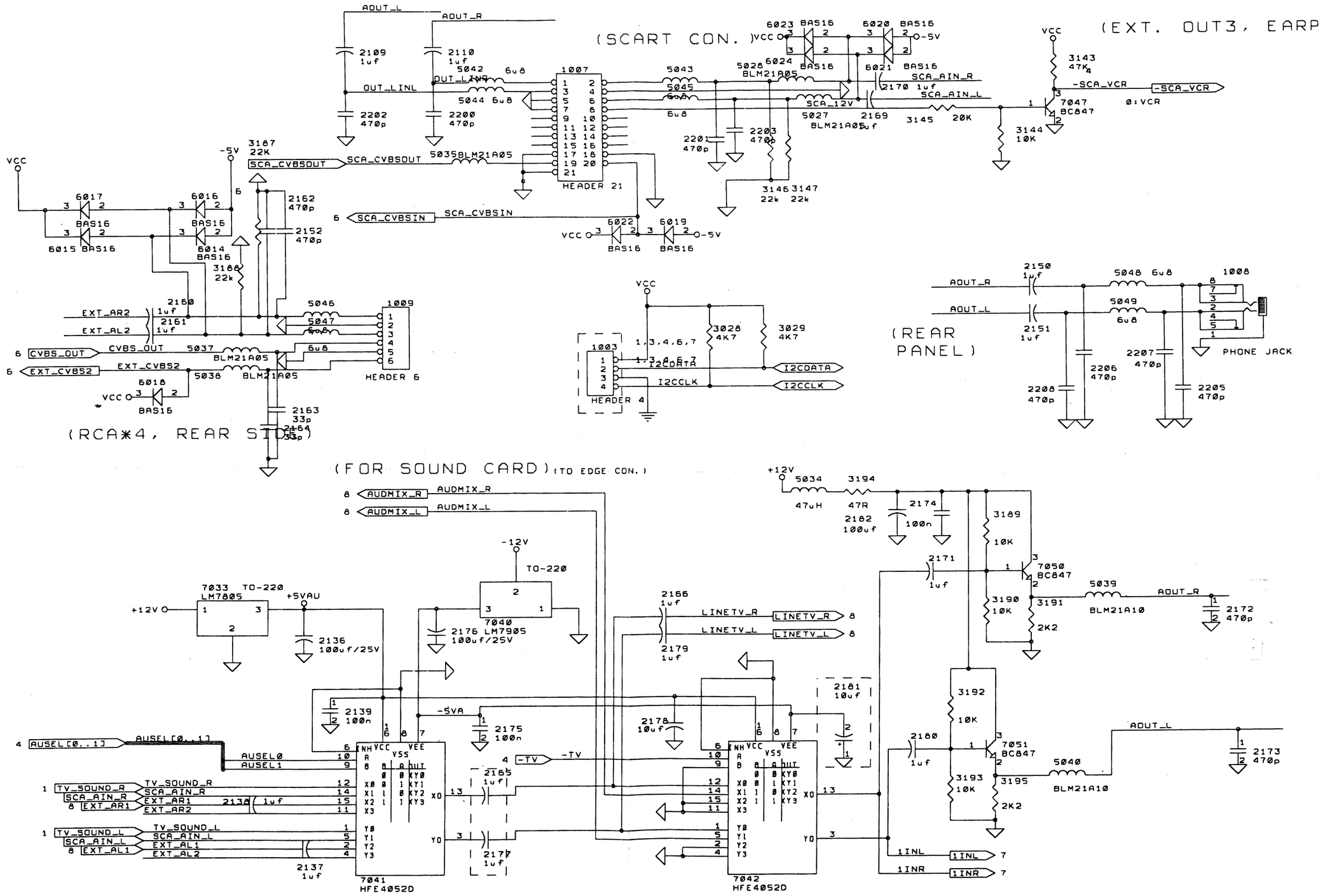


Signal Selection Schematic Diagram

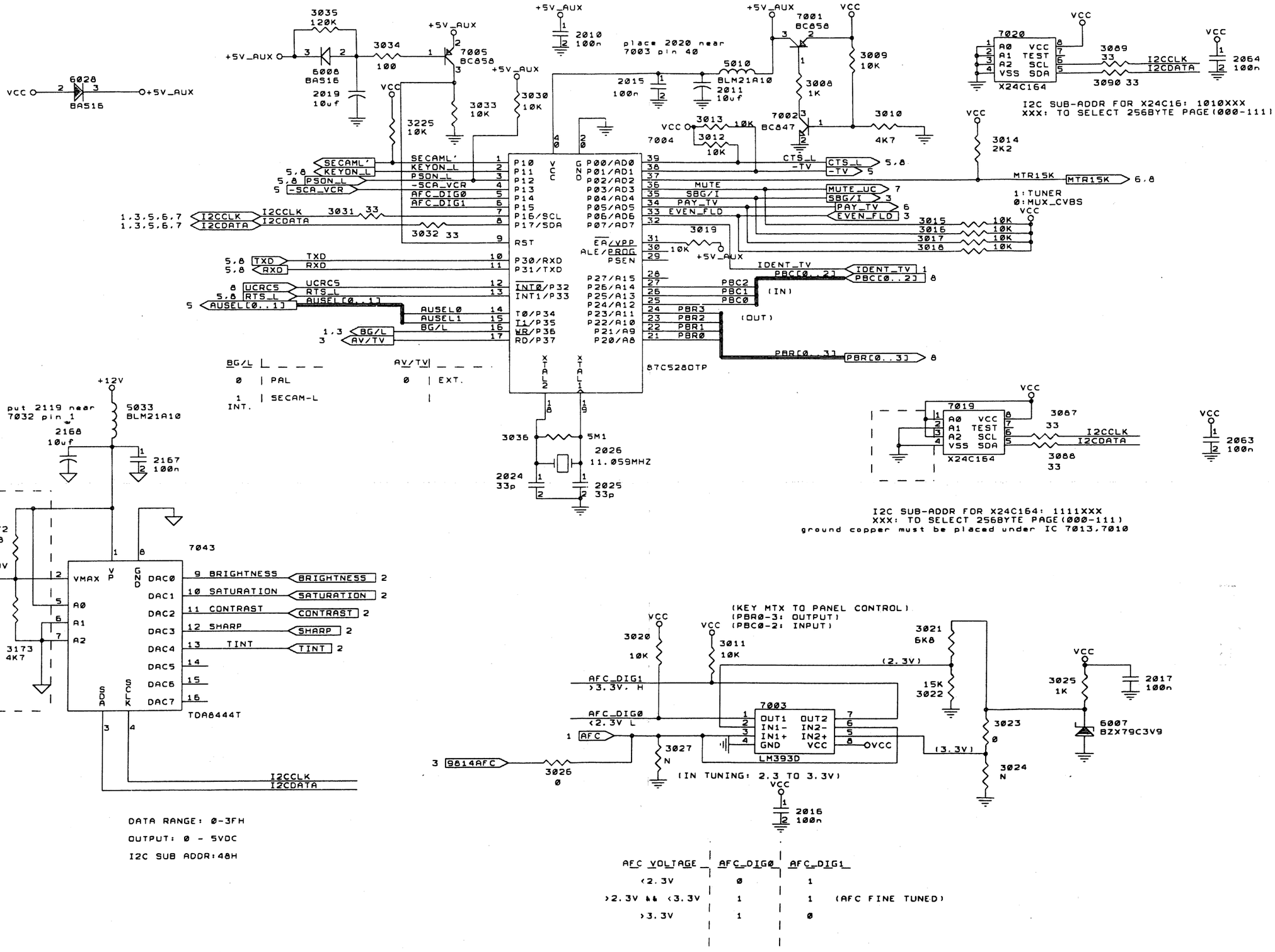
[FD 150, 200, 201 und 202]



Intern-Extern Connectors & Audio Max Schematic Diagram

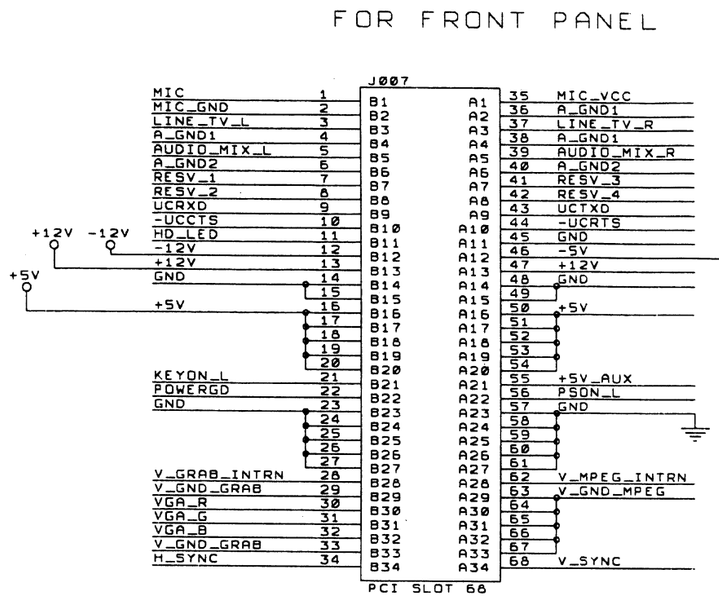


ISA Interface & IR Schematic Diagram



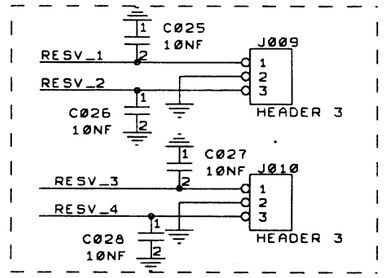
[FD 150, 200, 201 und 202]

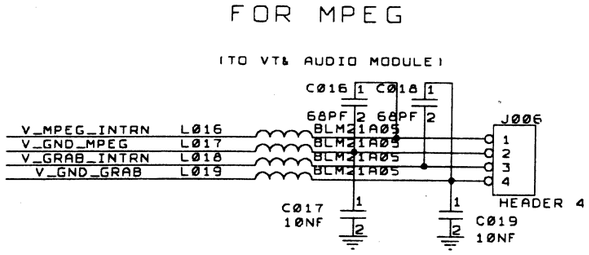
Edge Connector Schematic Diagram

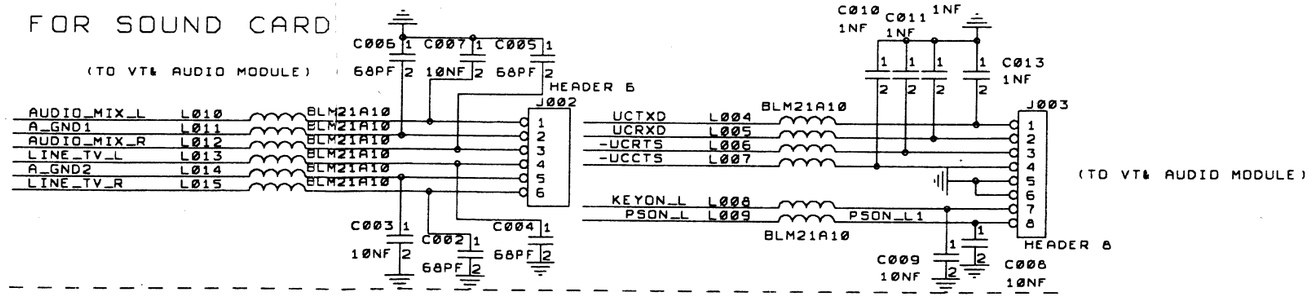


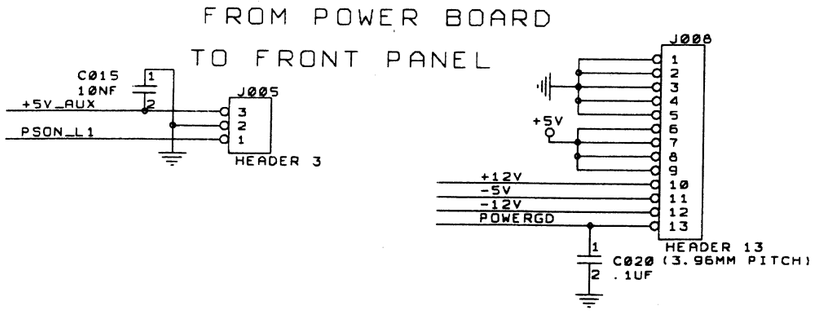
Connector Type : M.C.A.type

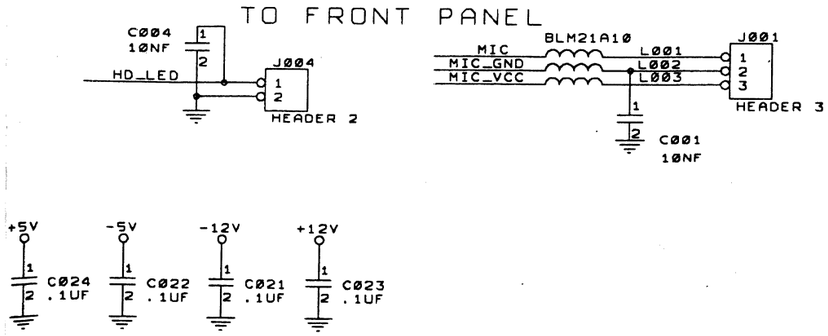
Edge Connector: Burndy "Computer Bus" (CEE2x45S-V3-Z14)



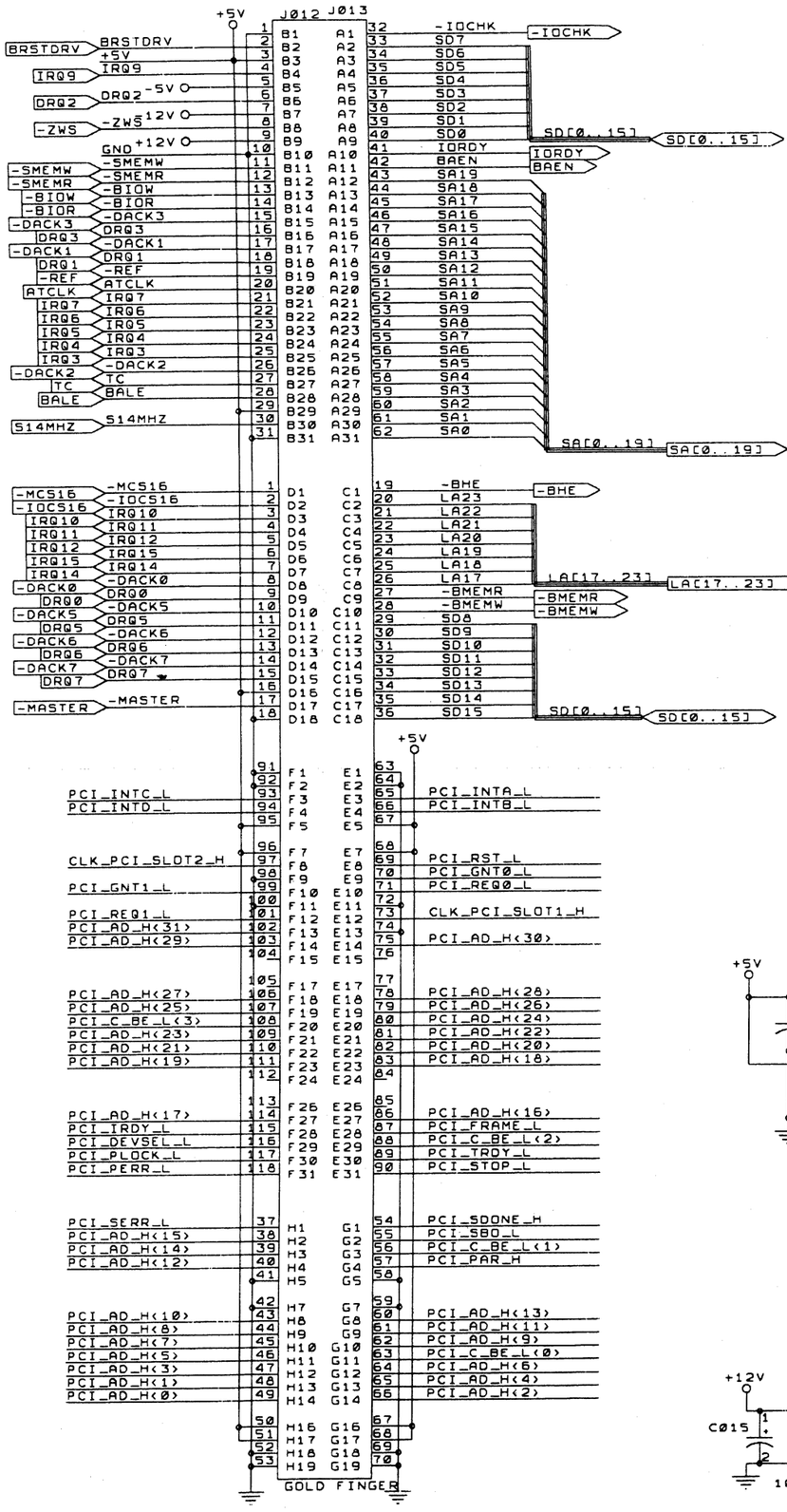


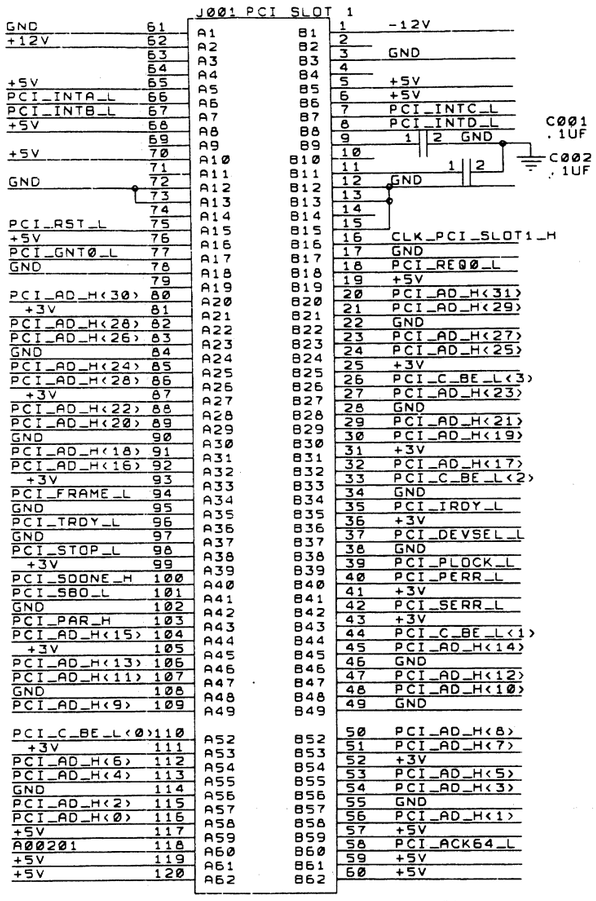


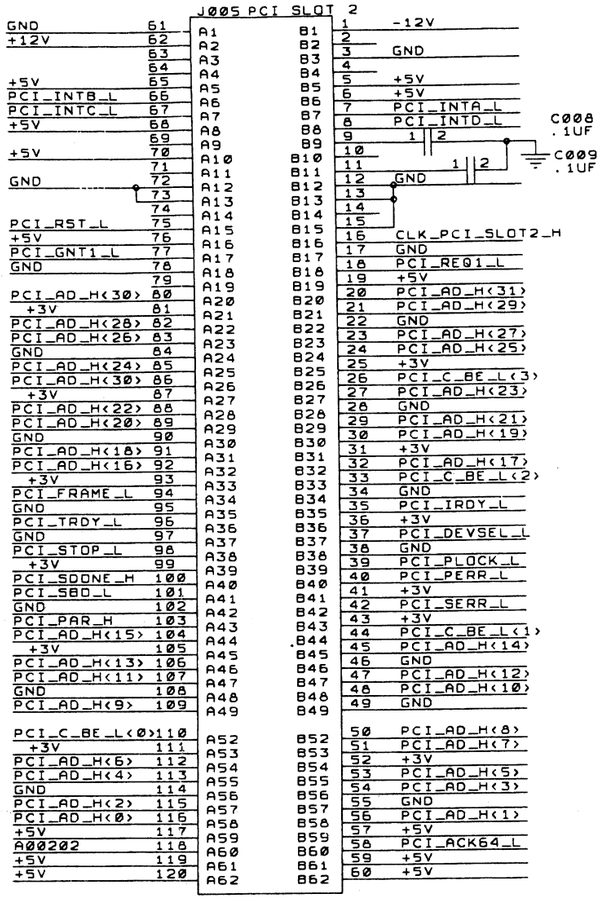




Eisa & PCI Connector Diagram

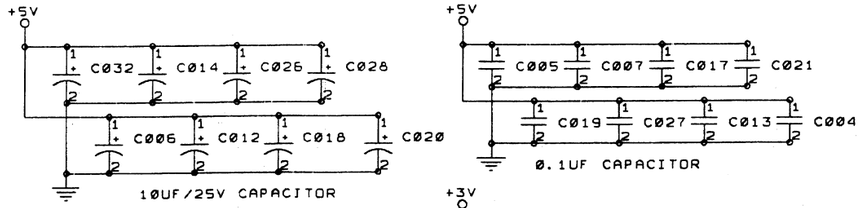


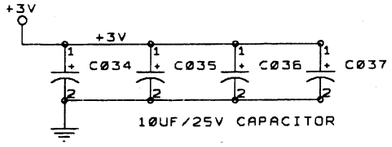


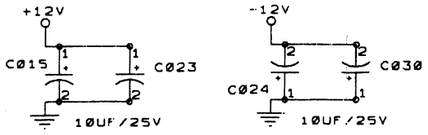


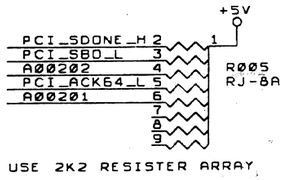
CONNECTOR TYPE : PCI TYPE

EDGE CONNECTOR : FOXCONN " M.C.A. CONN"
EH060**-**(-*)

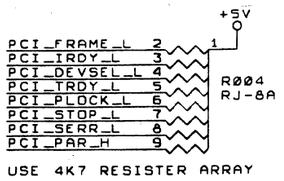




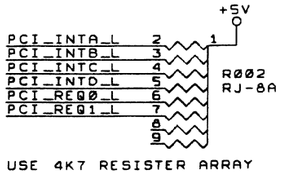




USE 2K2 RESISTER ARRAY



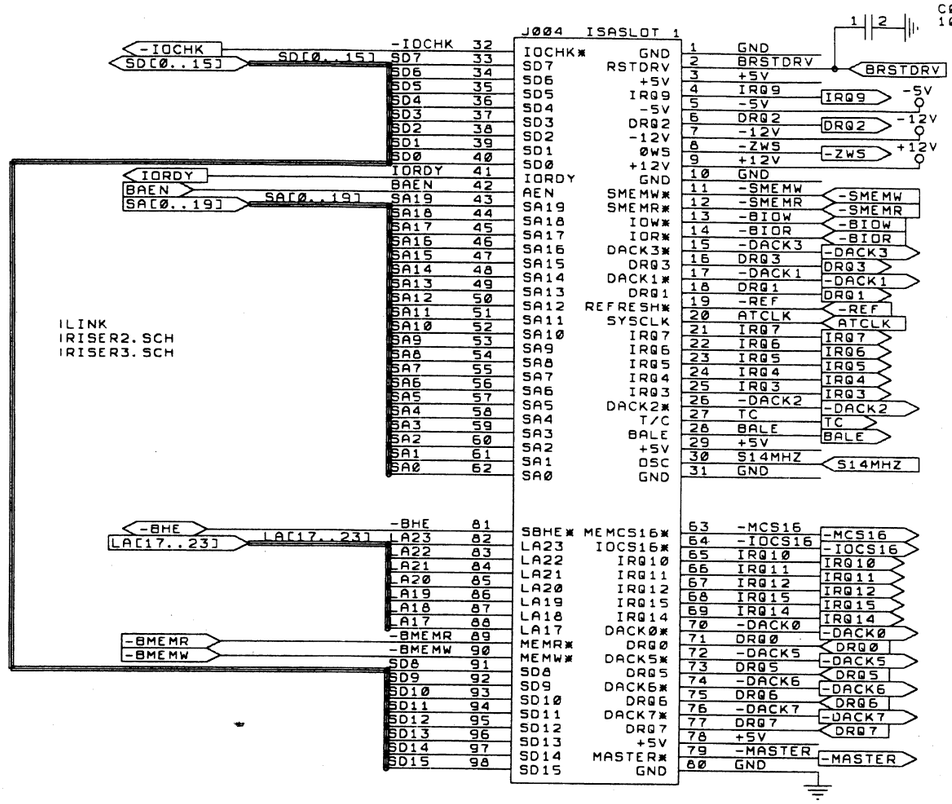
USE 4K7 RESISTER ARRAY



USE 4K7 RESISTER ARRAY

[FD 150, 200, 201 und 202]

ISA & Private Sound Connector Diagram



Power Supply Schematic Diagram

ISSUE: 2

DATE: 23 Feb 1995

	NOW	BEFORE
5198	47R	1K
3196	47K	200K

DATE 28 Feb 1995

7118	FORSD	BC548C
2115	1000u/25V	100n
5128	2.4K	(ADDED)

DATE 14 MAR 1995

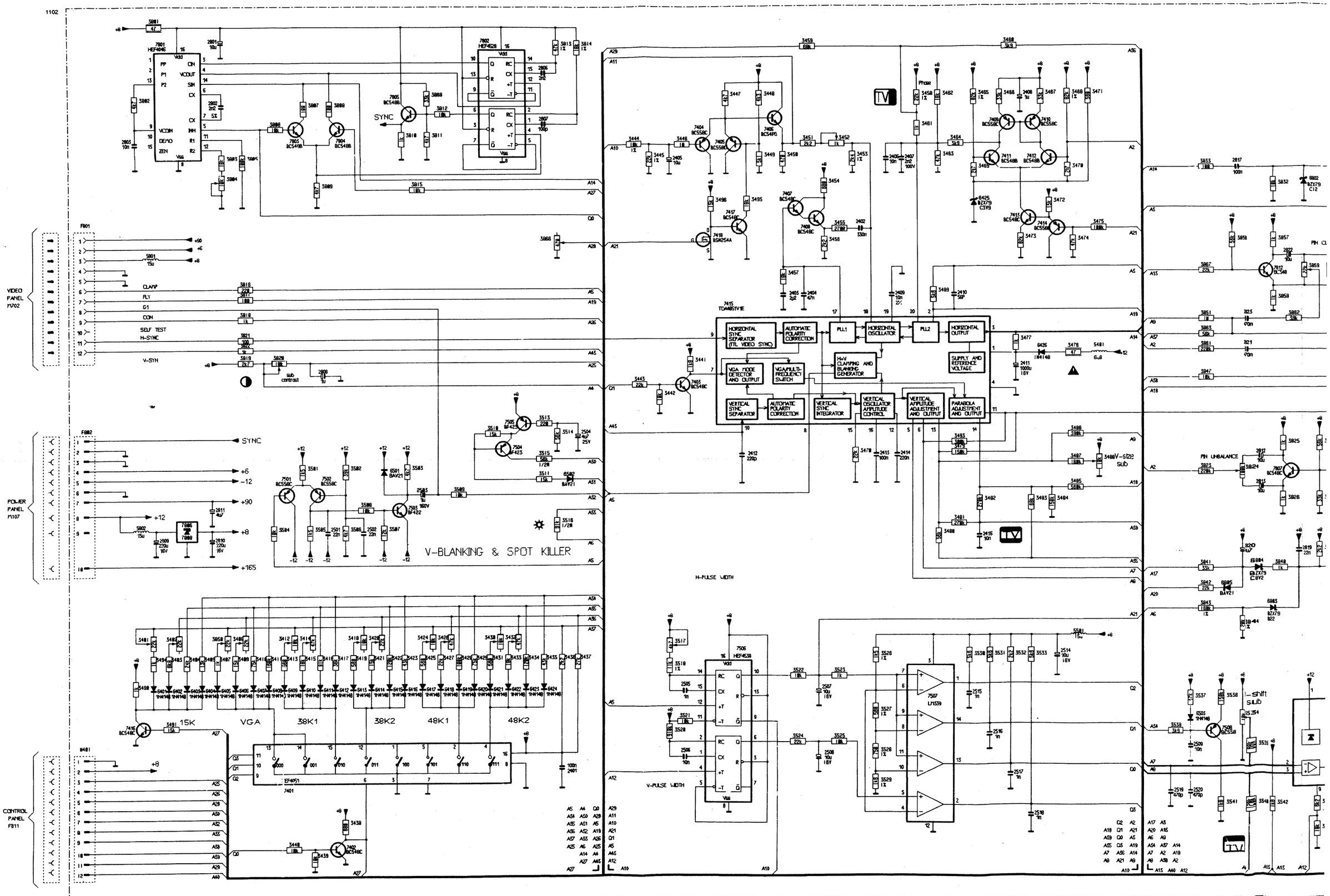
7118	BC548C	FORSD
2117	4n7 250V	(DELTED)
2104	0.015uf	4n7 250V
5128	2.4K	(DELTED)
2171	1000u/16V	(ADDED)
2172	1000u/16V	(ADDED)
5209	20R	10R

DATE 02 MAY 1995

	NOW	BEFORE
3105	47K	15R
3106	100R	51R
3157	33R	15R
3158	51R	33R

[FD 150, 200, 201 und 202]

Deflection Schematic Diagram



x-ray protection

PIN CUSHION

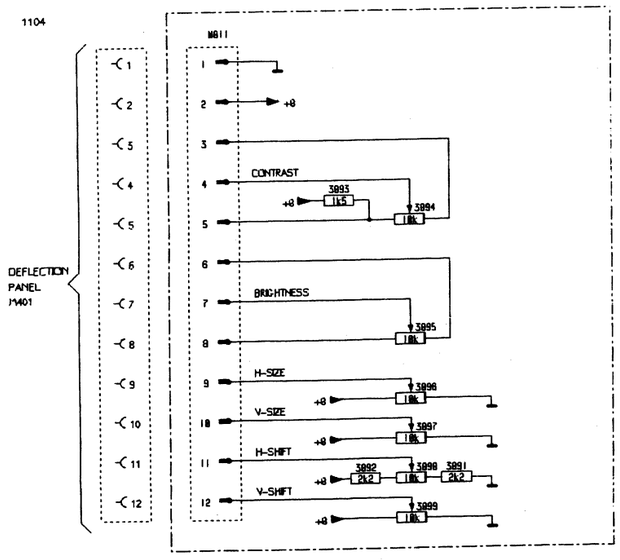
PIN UNBALANCE

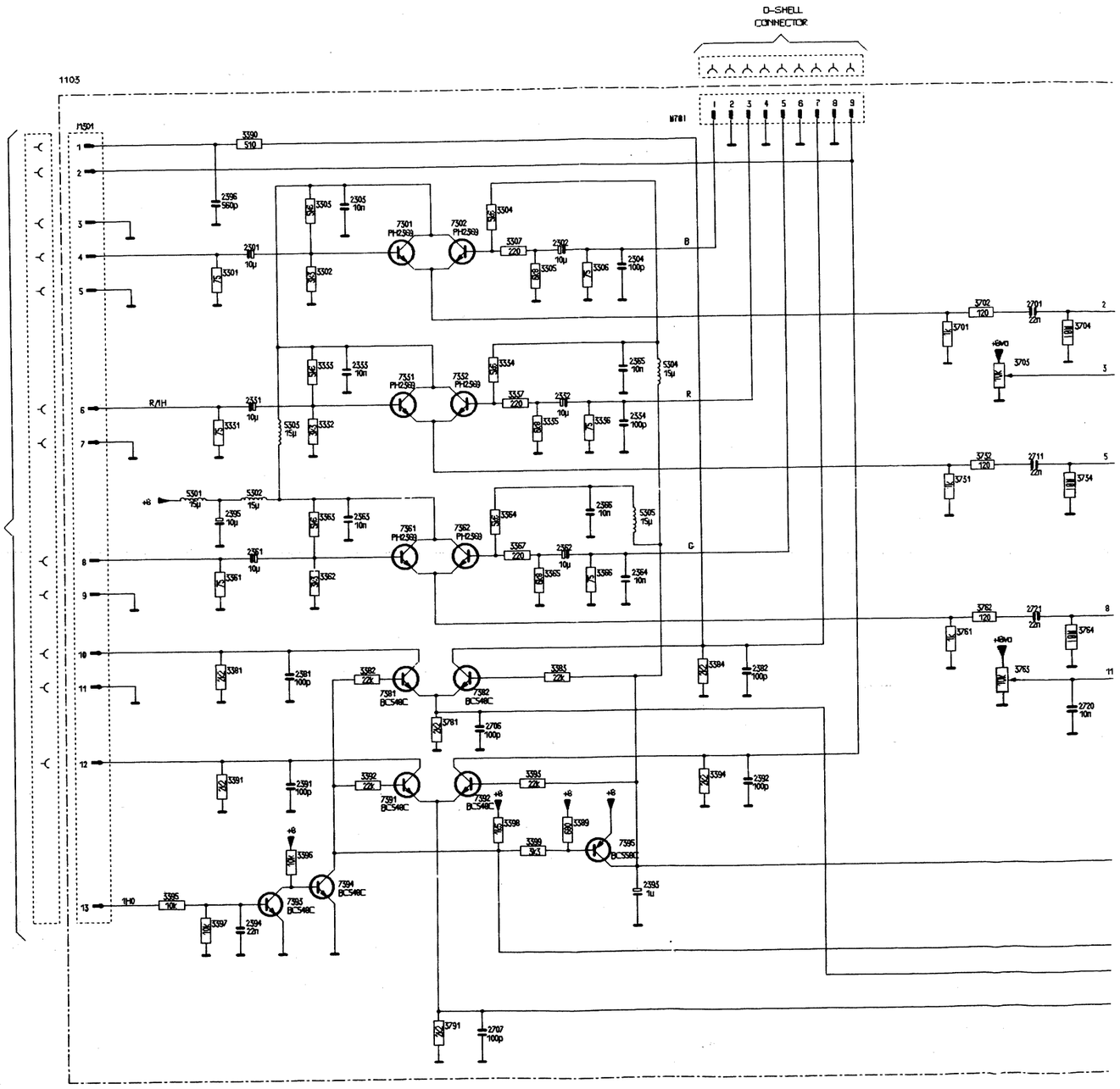
V-Defl

H-Def1

EHT

Video Schematic Diagram





VIDEO PANEL

D-SHELL CONNECTOR

M781 1 2 3 4 5 6 7 8 9

7751 TDA4882

CLAMP CLIPPING

U/I

REF CAIN

DEC.

2SC5467 7701

2SC5467 7711

2SC5467 7721

2SD756 2SB716

BAV21

B-CUTOFF

R-CUTOFF

G-CUTOFF

+8V0 +5.1 +50 +8

24KV

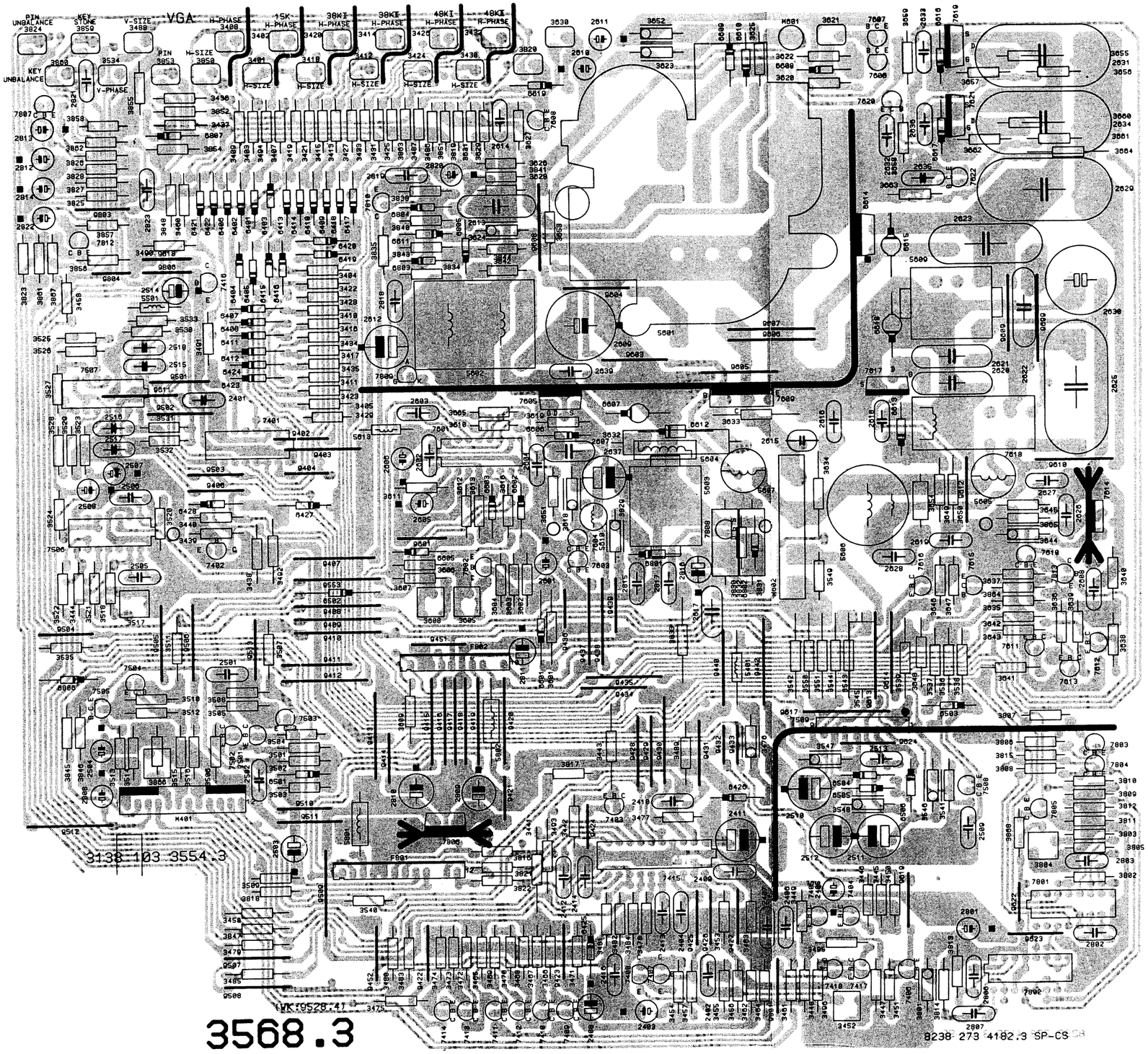
LOT FT FOCUS EHT G2

M702

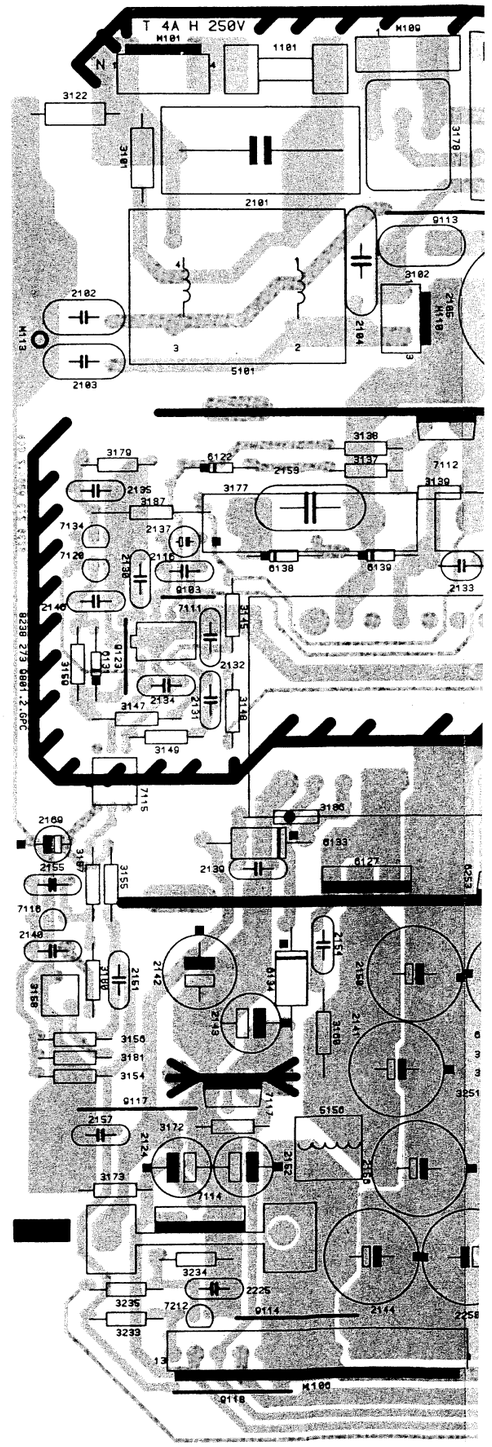
DEFLECTION PANEL F801

+50 +6 (H1) +8 GND GND (H2) CLAMP FLB G1 CONTRAST H-out V-out

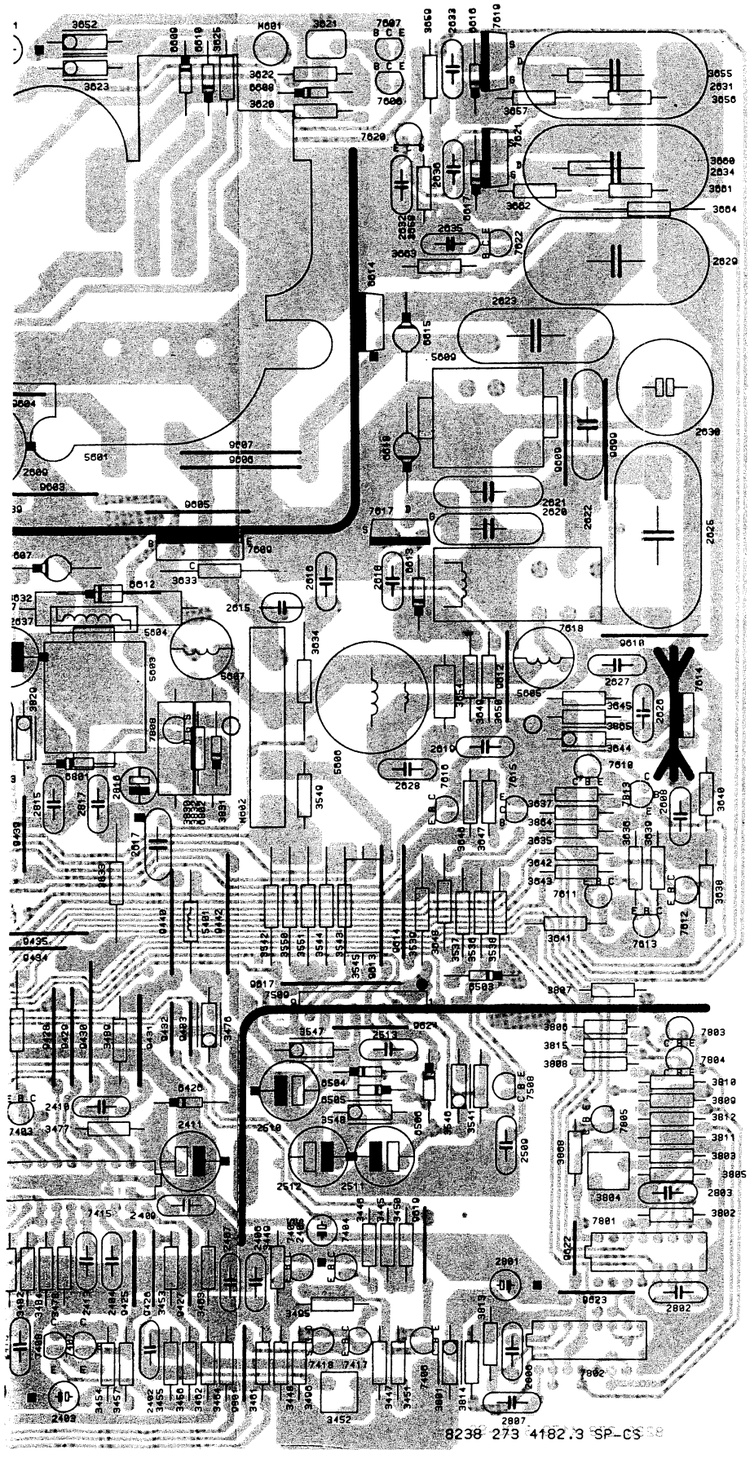
Deflection P.C.B. Component Diagram

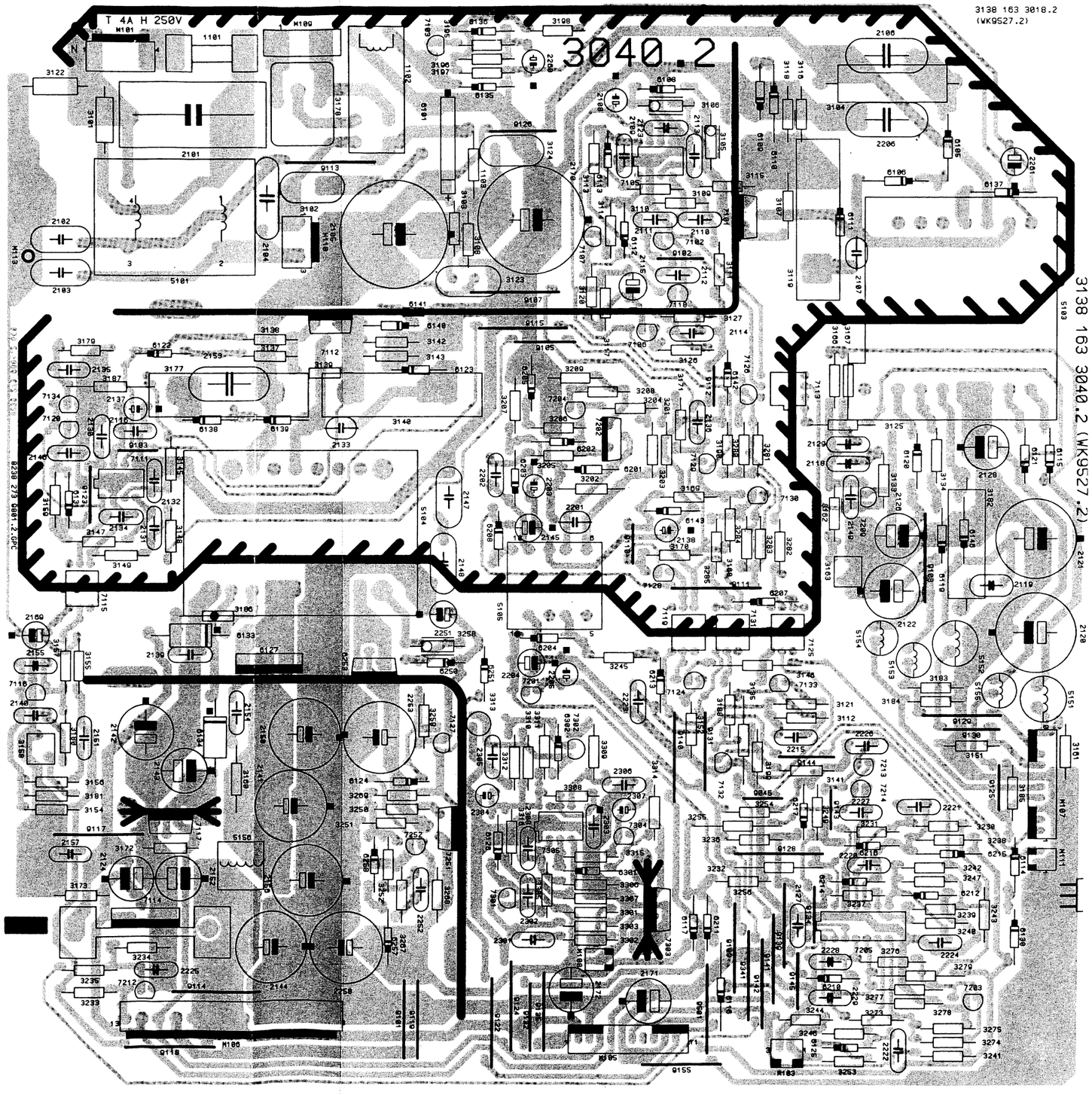


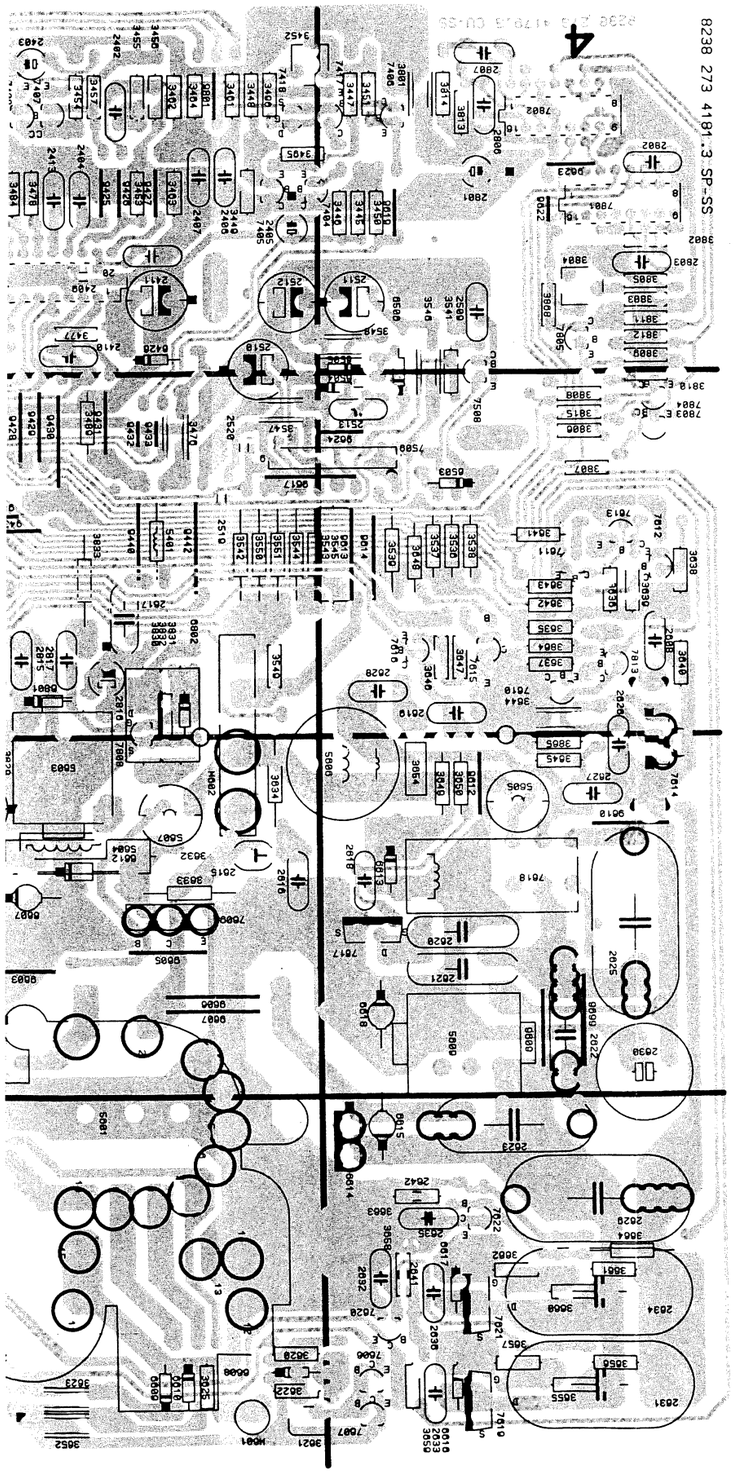
Power Supply P.C.B. Component Di

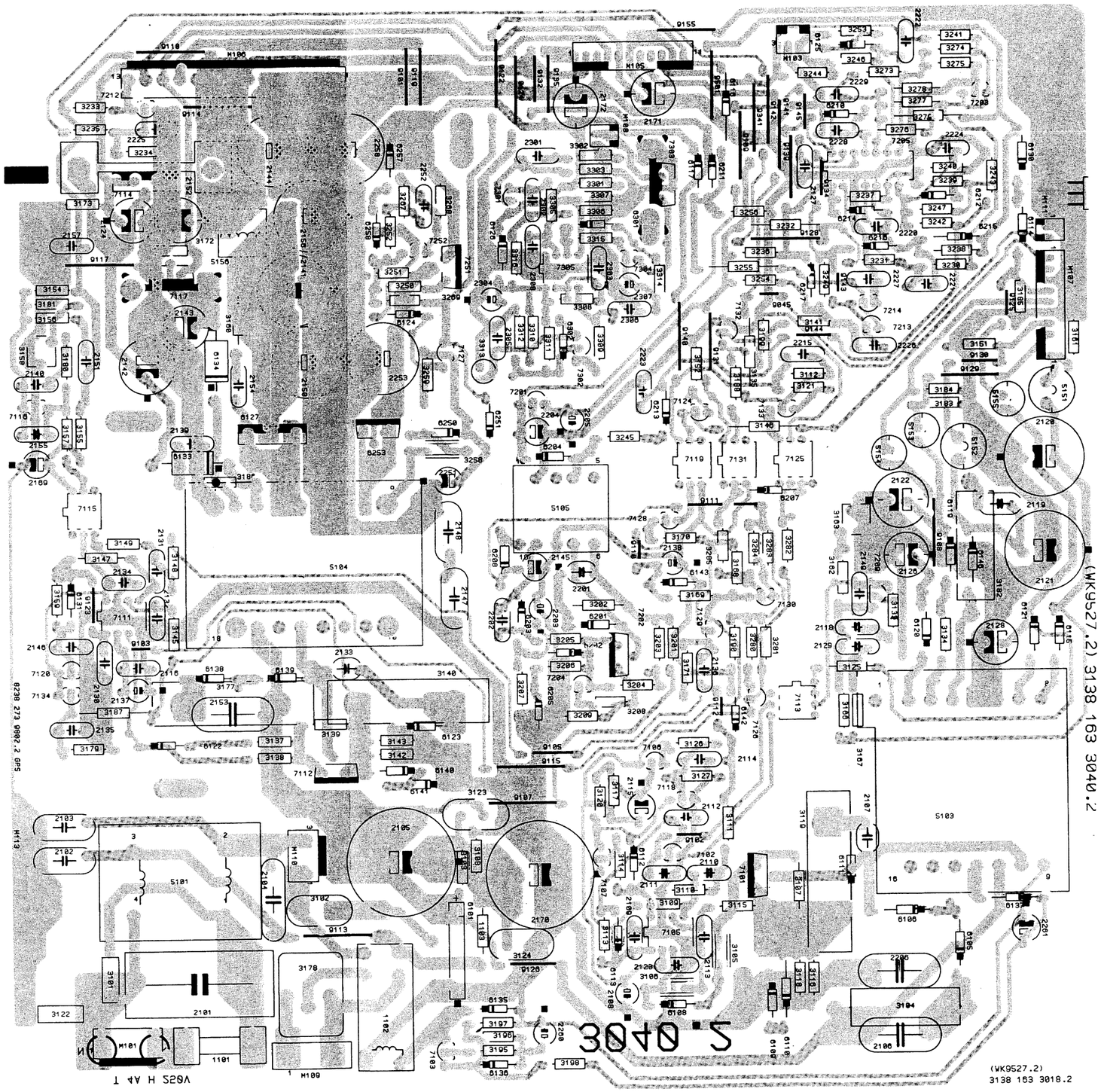


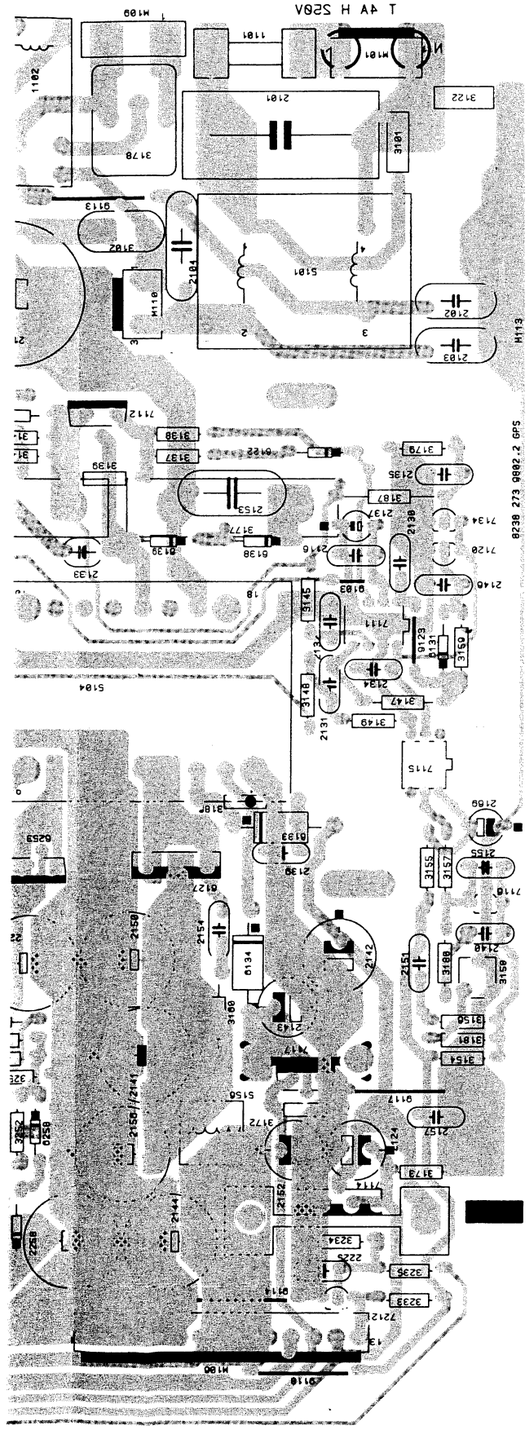
Power Supply P.C.B. Component Diagram

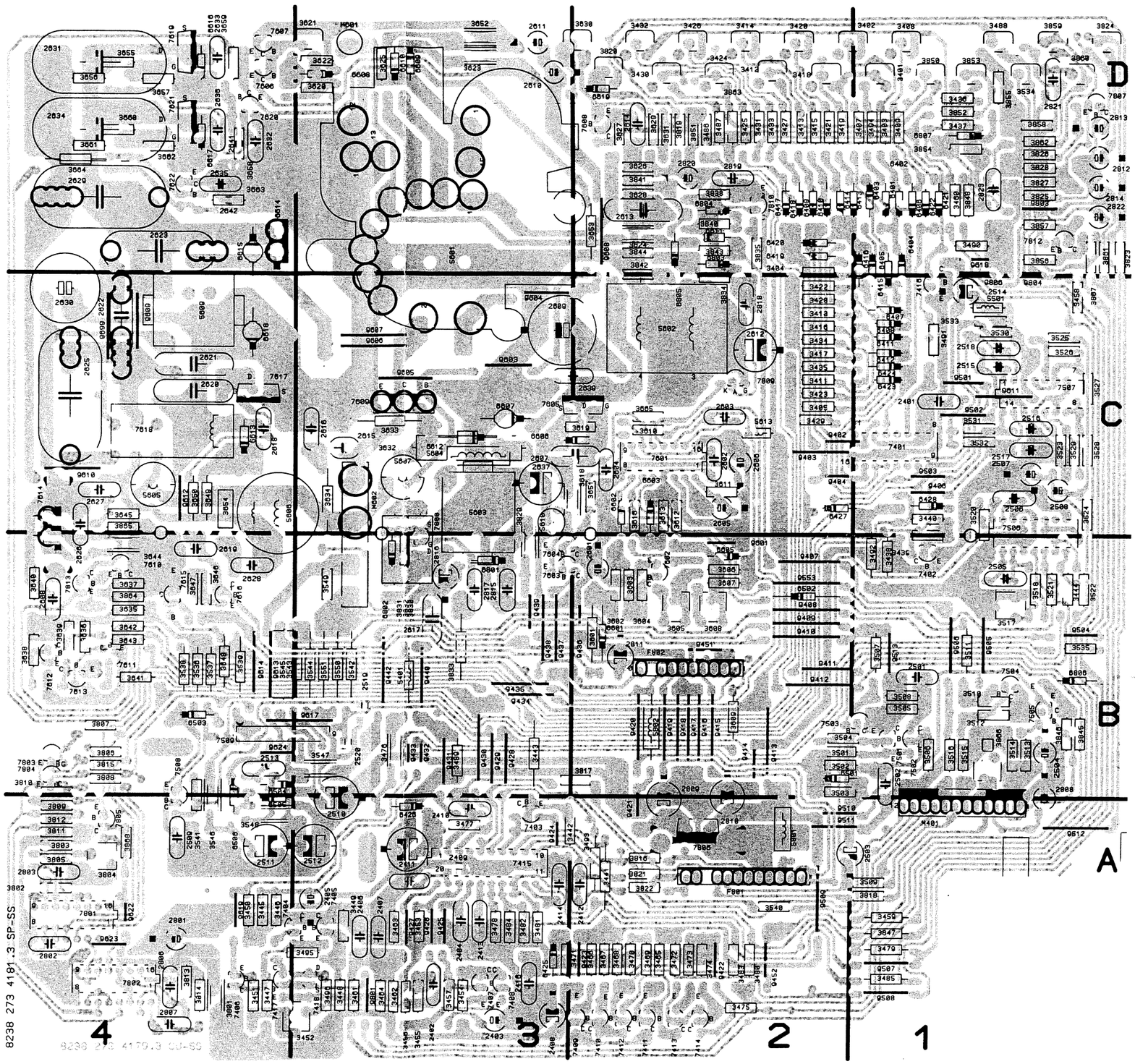




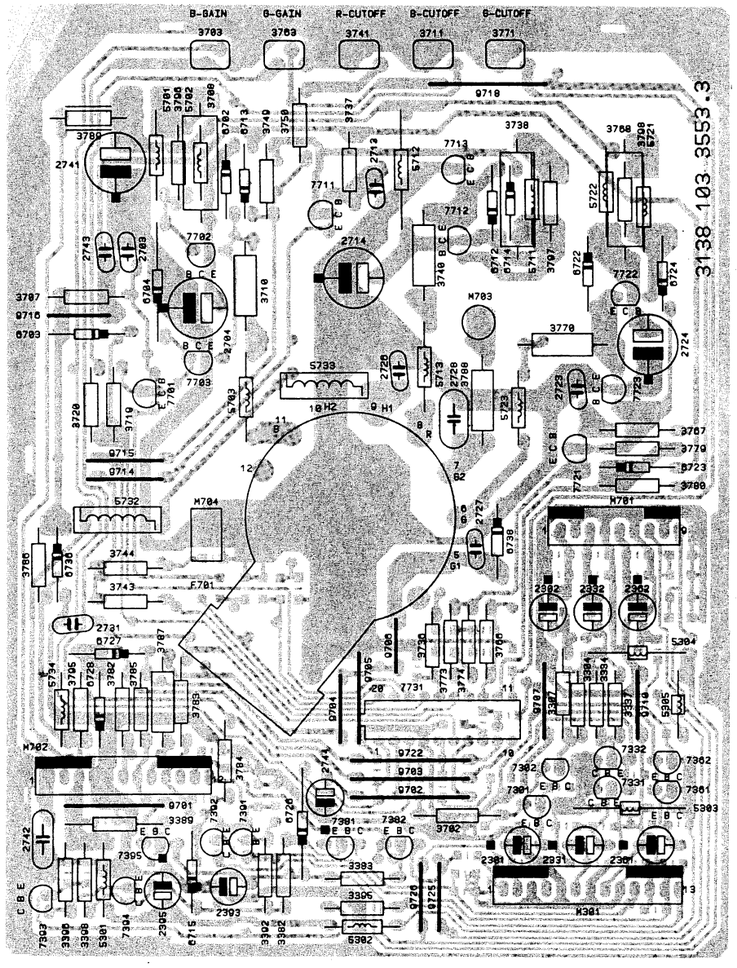

8238 273 4181.3 SP-SS
4

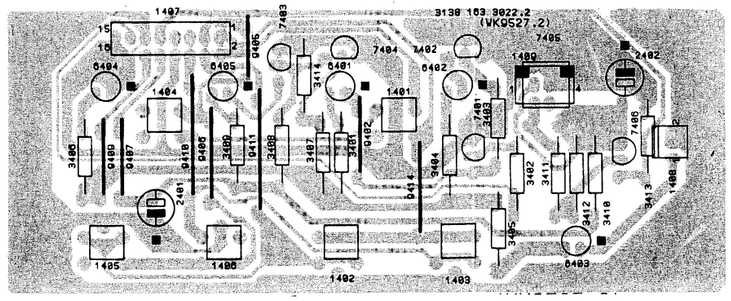

(WK9527.2) 3138 163 3040.2
8238 273 9882.2 GP5
V02S H AA T
(WK9527.2)
3138 163 3018.2

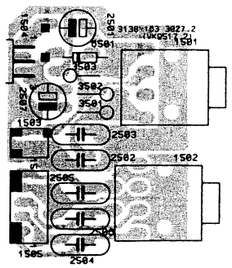


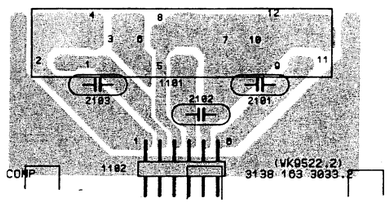

8238 273 4101.3 SP-SS
8238 273 4179.3 CU-SS
A
B
C
D
1
2
3
4

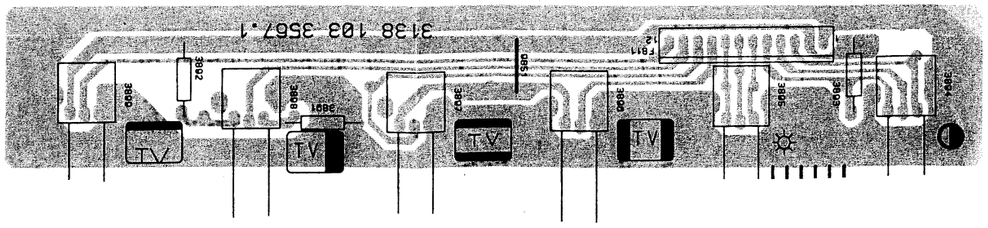
Video P.C.B., Jack P.C.B., Control P.C.B. Component Diagram



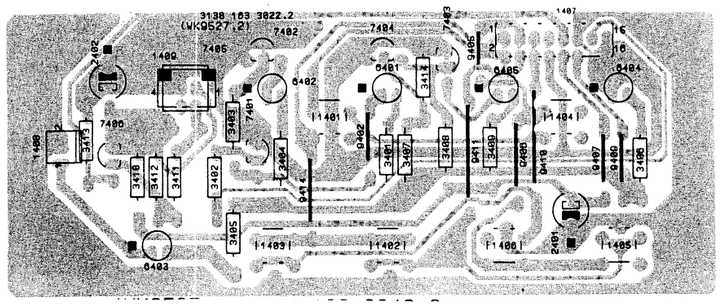


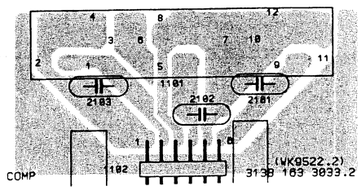


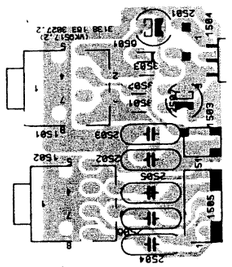


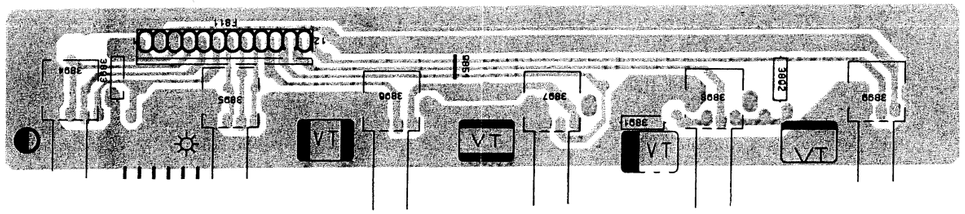


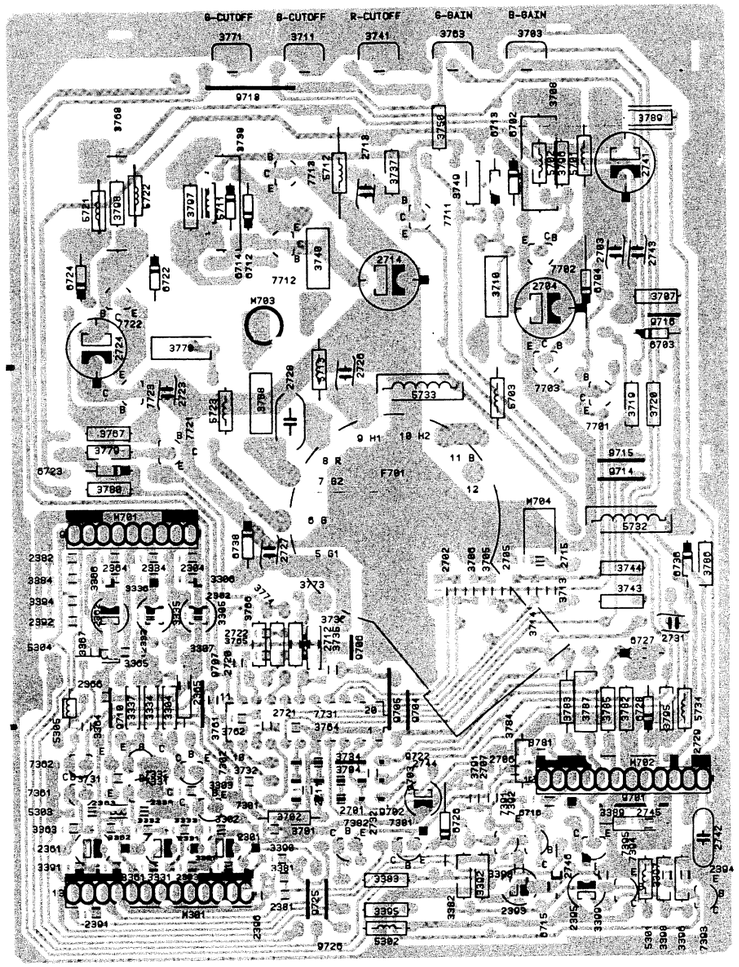
[FD 150, 200, 201 und 202]


3138 109 3022.2
(WK9527.21)


(WK9522.2)
3138 109 3033.2
COMP






G-CUTOFF
B-CUTOFF
R-CUTOFF
G-GAIN
B-GAIN